BRITISH MEDICAL JOURNAL

LONDON SATURDAY MARCH 14 1942

IMMUNIZATION AGAINST DIPHTHERIA WITH ALUM-PRECIPITATED TOXOID

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DISCUSSION

Though the results obtained in this paper raise many subjects for discussion, space demands that we restrict ourselves to the main point at issue—namely, the optimal dosage of A.P.T. when given in two doses for the immunization of children.

The recommendation by the Ministry of Health of two doses of 0.1 and 0.3 c.cm. at not less than four weeks' interval has been subjected to severe criticism by Bousfield (1941 a, b, c, d) and Lewis (1941b) as being not only insufficient to bring about an adequate degree of immunity but as being positively harmful to the cause of diphtheria immunization as a whole. It is therefore interesting to review briefly the dosage of A.P.T. used by previous workers and to compare the efficacy of the different doses as judged by the Schick test performed at a suitable time after inoculation. The data are summarized in Table VIII.

TABLE VIII.—*Immunizing Effect, as judged by the Schick Test, of Two Doses of A.P.T.*

Observer	No. Tested	Doses in c.cm.	Interval between Doses	Interval between Second Dose and Schick Test	Result of Schick Test
Powell (1935) ..	9	0·1 + 0·1	1 mth.	1 mth.	100% neg.
„ (1936) ..	100	0·1 + 0·4	2 wks.	?2–3 mths.	99% „
Parish (1936) ..	35	0·1 + 0·2	3 „	12 wks.	100% S.C.R.
„ „ ..	129	0·1 + 0·5	3 „	5 „	99·2% „
Sigurjónsson (1936)	731	1·0 + 1·0	3 „	7–8 mths.	95·8% „
Anderson (1937) ..	52	0·1–0·2 + 0·2–0·3	1 wk.	3 „	82·7% neg.
Russell (1937) ..	159	0·1 + 0·5	2 wks.	?3 „	98·1% „
Bousfield (1938)*	611	0·2 + 0·5	2 „	3–5 „	98·7% S.C.R.
Chesney (1938) ..	1,555	0·1–0·2 + 0·4–0·5 or less	4 „	2 „	99·6% neg.
Harder, Gelperin, and Cook (1939)	100ca	1·0 + 1·0	4 „	3 „	90·0% „
Lewis (1941a) ..	760	0·1–0·25 + 0·5 or less	2–4 „	2–3 „	99·2% S.C.R.
„ „ ..	279	„ „	2–4 „	2–3 „	98·9% neg.
Bousfield (1941b)	187	0·1 + 0·3	4 „	3–5 „	92·5% S.C.R.
Fulton *et al.* (this paper)† ..	2,346	0·1 + 0·3	4–6 „	8–16 wks.	97·8% „

S.C.R. = Schick-conversion rate.
* Results obtained with one unsatisfactory product omitted.
† Results obtained with two unsatisfactory products omitted.

In the last column of this table the results are expressed in terms of the Schick-conversion rate (S.C.R.) if immunization was confined to known Schick-positive children, and in terms of the Schick-negative rate if a pre-immunization Schick test was not carried out.

It will be noted that most workers used an initial dose of 0.1 c.cm., and that the second dose generally varied from 0.3 to 0.5 c.cm. With the exception of Anderson (1937), who allowed only a week between the two doses, and of Bousfield (1941b), whose observations were made on a relatively small number of children, the Schick-negative or the Schick-conversion rates recorded varied between 97.8 and 100%. Apart from these, it is noteworthy that the two lowest rates—95.8 and 90%—were obtained by workers who injected two doses of 1.0 c.cm. each. It is difficult, therefore, to understand on what grounds the unexpectedly vehement opposition to two doses of 0.1 and 0.3 c.cm. is based.

Admittedly certain batches of A.P.T. are of low antigenic quality. Is an increase in the dosage, however, going to remedy this defect? With the B1 product referred to in Tables IV and V, which had an Lf value of only about 13 units per c.cm., the following results were obtained:

0.1 and 0.3 c.cm.	.. .. ..	68.2%	Schick-conversion rate
0.2 and 0.4 c.cm.	.. .. ..	51.9%	„ „ „
0.5 and 1.5 c.cm.	.. .. ..	70.7%	„ „ „

The number of children tested was not large, but it will be observed that even a fivefold increase in the total dosage failed to effect any appreciable improvement in the Schick-conversion rate. While we do not deny that with a product of moderate potency an increase in dosage may stimulate a better antibody response, it is clear that no practicable increase in dosage is going to remedy the antigenic deficiency of a poor product. The main conclusion, therefore, is that for adequate immunization a product of high antigenic potency is essential. With such a product dosage becomes of secondary importance.

The Antigenic Effect of A.P.T.

In trying to formulate a suitable system of dosage of A.P.T. for general use in children, two main factors must be considered: first, the antigenic effect; secondly, the degree of local and constitutional reaction likely to be caused. Unfortunately these two factors are antagonistic to each other. In the absence of properly documented evidence it may be assumed that, within limits (see below), the larger the dosage is, the better will be the antibody response but the worse will be the resulting tissue reactions; the smaller the dosage is, the poorer will be the antibody response but the less will be the trouble caused by severe reactions. There is clearly no perfect system of dosage; whatever system is adopted must be a compromise. Before deciding what compromise to recommend it is necessary to consider a little more closely the two main factors concerned.

A reasonably uniform antigenic stimulus could be assured if practicable methods for the assay of the potency of diphtheria prophylactic, similar in principle to those applied to other biological products, were available. It would then be possible to specify, either in units or by reference to a standard preparation, the quantity of A.P.T. which should be contained in each dose. A solution of the problem on these lines, however, presents great technical difficulties. Ramon (1925) maintained that the flocculation value of a formol toxoid was a good index of immunizing power. Experience, however, has shown that, though a formol toxoid with a high flocculation value is generally a better antigen than one with a low value, there are too many exceptions to this rule to permit of the flocculation value alone being taken as an accurate index of antigenic potency. In order to ensure that an adequate antigenic stimulus is provided, two essential requirements should be fulfilled in the preparation of A.P.T.: first, each preparation should contain an adequate quantity of antigen per unit volume; secondly, the antigen must be of high immunizing quality. Both of these desiderata are apparently met by the preparation of A.P.T. in the way described by Barr, Glenny, Pope, and Linggood (1941). This point will not be discussed further, as many of the samples used in the field trials described in this paper are being studied at the National Institute for Medical Research, Hampstead, one object of these investigations being to determine whether laboratory tests can be devised for the more efficient control of diphtheria prophylactic, A.P.T.

Some authors too readily assume that the antibody response to A.P.T. is in direct proportion to the dose given. Our information on this subject is deficient, but two observations deserve attention. Pharmacologists have found that in general the response to a drug varies not with the dose but with the logarithm of the dose. For example, doubling the dose does not double the response, but increases it to a considerably smaller extent. Again, immunologists have shown that the antibody response to an antigen varies with the point on the dose-response curve at which the antigen is given. At one range of the scale the curve rises steeply and the response to increase in dosage is maximal. Below or above this range the response falls off considerably. Taking the upper range, it is evident that above a certain critical level an increase in the dose will have relatively little effect on the production of antitoxin. If, for example, it can be shown that two doses of 0.1 and 0.3 c.cm. of A.P.T. produce on the average a given amount of antitoxin, there is no reason for supposing that two doses of 0.2 and 0.6 c.cm. will double the antitoxin production. Indeed, since there is reason to believe that with a high-quality product, such as that prepared by maker A, two doses of 0.1 and 0.3 c.cm. are near the upper limit of the maximal dose-response range, it is very doubtful whether raising the dose is likely to bring about any considerable increase in the production of antitoxin. These theoretical considerations are borne out by the observations of Saunders (1932), who found that a Schick-negative rate of 100% occurred as readily after a total dosage of 4.5 Lf units as after one of 22 or 30 Lf units, and by those of Park and Schroder (1932), who, using toxin-antitoxin mixture, obtained as good an immunizing effect after a 0.1 L+ dose as after 3 to 6 L+ doses. However, without making careful antitoxin titrations after injection of different quantities of A.P.T. it will be impossible to form any sound judgment on the relation of dose to antibody production.

On general grounds the greater the amount of antitoxin produced the longer is immunity likely to last. It is dangerous, however, to take the Schick-negative rate after any long interval of time as a measure of the antitoxin generated, unless the children under observation are known not to have been exposed in the meantime to diphtheritic infection. In practice this can rarely be guaranteed, and for that reason a wide discrepancy is noticed between the reports of various observers on the duration of immunity. Latent infection augments the immunity conferred by inoculation, and the two effects cannot be disentangled. Some observers, such as Park (1922), working in densely populated cities, have had few Schick relapses over a period of many years, whereas others, working in areas where there has been little diphtheria infection, have had high relapse rates. Fraser and Brandon (1936), in Canada, for example, found that of children who had received three doses of formol toxoid five years previously and who had not been exposed to infection since, 34% had reverted to the Schick-positive state. Schwartz and Janney (1938), in the United States, recorded a Schick-relapse rate of 22% in children who had been inoculated six to seven years previously with formol toxoid and who had been living since in a neighbourhood with a low diphtheria incidence rate. Sigurjónsson (1939), in Iceland, likewise found that 26% of children who were Schick-negative seven to eight months after immunization had relapsed to the Schick-positive state four years later. It may be noted that Sigurjónsson gave two inoculations of 1.0 c.cm. of A.P.T. at three weeks' interval, the number of Lf units per c.cm. being not less than 50. His conclusion that immunity to diphtheria is transient unless it is maintained by latent infection deserves serious attention, confirming as it does one of the fundamental theses inherent in the work of Dudley and his colleagues (1934). In this connexion the following quotation from these authors is apposite: "The observations on 'diphtheria' in inoculated subjects show that, *provided it is known that the Schick test has once been negative*, relapses of Schick or antitoxin immunity are really of little consequence. The potential factors of 'immunizability' and 'durability' appear to remain permanently augmented by the same stimulus which produces the appearance of specific antibody, which is apparently a more variable and less permanent factor. Thus, although subjects may have lost their Schick or antitoxic immunity, they still possess a greatly augmented immunizability and rapidly regain Schick immunity on contact with T.C.D. (virulent diphtheria bacilli), generally latently and without symptoms."

The main conclusion, therefore, that emerges from this brief discussion on the antigenic effect of A.P.T. in relation to dosage is that the product used must contain an adequate amount of antigen of high immunizing quality, and that, provided such a product is used, there seems little advantage to be gained by increasing the dosage above that necessary to bring about an average Schick-conversion rate approaching 100%.

Local and Constitutional Reactions

Turning now to the local and constitutional reactions produced by A.P.T., there is a wide variation between the figures recorded for their frequency by such observers as Swyer (1932), McGinnes *et al.* (1934), Faragó (1935), McSweeney (1935), Patterson (1935), Underwood (1935a), Naughten *et al.* (1935), Harrison (1935), Sigurjónsson (1936), Hanly (1937), Jensen (1937), Paschlau (1939), Stott and Duke (1940), Bunch *et al.* (1940), and Lewis (1941a). There are probably several reasons for this. Certain batches of A.P.T. are known to excite more reaction than others; reactions are commoner in Schick-negative than in Schick-positive persons, and commoner in older than in younger children. In addition it is often difficult to obtain accurate information, in non-residential institutions, on the

degree of reaction or even on its occurrence. In our own experience, for example, we found that a certain proportion of children did not attend school for a day or two after inoculation. Possibly this may have been due to factors unconnected with the inoculation itself; on the other hand, their absence may have been accounted for by unusually severe reactions. If, therefore, the number and degree of reactions are assessed merely on the children who do attend school a false impression may easily be gained. There is little doubt, however, that a certain proportion of severe reactions do occur, and these constitute a serious drawback to the use of A.P.T. Unfortunately our information on the relation between the size of dose and the subsequent tissue reaction is very incomplete, and until more observations on this subject are recorded it is probably wiser to accept the assumption that, within limits, the smaller the dose the less will be the degree of reaction.

Dosage for Routine Use

In the light of these considerations it is now possible to discuss what dosage of A.P.T. should be recommended for general adoption in the immunization of school and pre-school children. Advocates of a large first dose, such as 0.5 c.cm., are apt to minimize the evil effect of occasional severe reactions, which in the experience of many observers (Patterson, 1935; Pickles, 1940; Stott and Duke, 1940) greatly prejudice the success of an immunization campaign. They argue that if the child does not return for its second dose it will at least develop some basal immunity to diphtheria toxin. Practically all workers with A.P.T., however, are now in favour of the two-dose method, and it is much better for a child to have a small first dose and return for a larger second dose than for it to experience such a severe reaction after a large first dose that its parents refuse to allow further inoculations to be made. Failures to attend for other reasons are more adequately dealt with by a proper follow-up system than by reliance on a large first dose.

A further argument sometimes used is that, even if a serious reaction does occur, it is of little practical importance, since it indicates that the child is already partly immune and does not require a second dose. The observations of Swyer (1932), Underwood (1935b), and Bunch *et al.* (1940), among others, show that there are too many exceptions to this rule for it to be generally applicable.

If a small first dose is the method selected, then it is necessary to choose between 0.1 and 0.2 c.cm. The smaller dose is quicker, cheaper, presumably excites less reaction, and, in our experience with A.P.T. containing an adequate amount of high-quality antigen, has resulted in a good Schick-conversion rate. Under certain conditions, however, it may have the disadvantage of approaching the borderline of satisfactory immunizing efficiency. For this reason, unless the inoculation is made in a properly calibrated syringe by plunging the needle up to the hilt through a valvular opening into the deep subcutaneous tissue, the full quantity may not be injected, or, if injected, may partly escape. Another error may be introduced by failure to ensure uniformity of the inoculum. This may happen either through neglect to shake the contents of the bottle thoroughly or because successive children are inoculated so slowly that partial flocculation of the alum toxoid occurs in the syringe. Mainly for practical reasons, therefore, a specified dose of 0.2 c.cm. is probably to be preferred to one of 0.1 c.cm., though there is no reason why the lower dose should not be given if circumstances point to its desirability.

On the whole, therefore, we are of the opinion that to minimize the risk of severe reactions and yet to provide a sufficient antigenic stimulus the first dose should be 0.2 c.cm. Some workers, particularly Lewis (1941a), prefer to give a larger dose to children under 8 years of age on the ground (*a*) that they suffer from severe reactions less often than older children, and (*b*) that, owing to lack of any basal immunity established as the result of latent immunization, they require a greater antigenic stimulus than children over 8 years. The wisdom of this is open to question. There is no sharp transition in the frequency of severe reactions at the age of 8 years; and it is doubtful whether, except in a heavily infected residential institution such as that studied by Dudley and his colleagues (1934), latent immunization plays a sufficiently important part to justify a differentiation of dosage for older and younger children. Lewis himself found no significant disparity in the immunizability of children in schools with widely different incidence rates of diphtheria, and in our own experience analysis of the Schick-conversion rate in relation to ages failed even to suggest that up to the age of 18 years there was any appreciable difference in the immunizability of the children (see Table VI, p. 319). Variation of dosage with age merely complicates what should be a simple routine procedure, and has little to recommend it.

The size of the second dose can generally be increased with greater safety, since, even if a severe reaction does occur, the child will have completed its immunizing course, and need not return for some years. In clinics where the doctor talks to the mother and is inoculating perhaps only 20 to 30 children an hour, the size of the second dose can be graded according to the severity of the reaction after the first dose; but in school practice, where the mother does not attend, and where, as in our experience, one doctor with suitable clerical and technical assistance can inoculate 300 to 400 children an hour, this is impracticable. For general use, therefore, it seems wise to recommend a dose of 0.3 to 0.5 c.cm. for the second inoculation.

Bousfield (1941b) prefers a two-weeks interval between the doses. His advocacy, however, of this method is based on convenience rather than on immunological considerations, and there is now an increasing body of evidence to show that the interval should be at least four weeks, and probably even longer. For practical purposes, however, four weeks may be accepted as a suitable time. If it is exceeded, even by some weeks or months, there is no reason to fear that the antibody response to the second dose will be in any way diminished.

Summary and Conclusions

In the course of inoculating about 30,000 children against diphtheria during the past two years, we have put the efficacy of our method on trial by Schick-testing a proportion of the children before and after inoculation. Our practice was to give inoculations of 0.1 and 0.3 c.cm. of alum-precipitated toxoid (A.P.T.) at an interval of four to six weeks, to Schick-test eight to sixteen weeks after the second inoculation, and to calculate the Schick-conversion rate.

Our observations were made almost entirely on school children in small towns and villages. Apart from evacuees in some of the schools, few of the children had been inoculated before, and with one or two exceptions there had been little diphtheria in the district for some time previously. Of 2,751 boys Schick-tested before inoculation 74.5%, and of 2,150 girls 83.1%, reacted positively. The intensity of the Schick reactions did not appear to be affected by the age of the child. Pseudo-reactions were uncommon, and were noted in only 1.2% of subjects. It is doubtful whether the injection of the control toxin is worth making at the primary Schick tests in children under 10 years of age; the error caused by its omission in our series would have been less than 0.2%.

Observations on the local tissue reaction to A.P.T. were made in only a few schools. Approximately half the children we did inspect showed some degree of reaction after inoculation. In the majority of these the reaction was circumscribed, but occasionally the whole of the upper arm, and very occasionally the forearm also, was affected. Sterile abscesses were reported in a number of children inoculated with one particular batch of A.P.T. Local reactions were found to be commoner in Schick-negative than in Schick-positive reactors. We had no opportunity of observing the constitutional reaction that may have followed inoculation.

Seven different preparations of A.P.T. from six different makers were studied. One preparation, referred to as A, was used exclusively in twelve schools, and as a control to one or more of the other preparations in ten other schools. Different batches of A.P.T. from any given maker were generally used for different schools. In 1,786 children inoculated with preparation A the Schick-conversion rate was 97.8%. Four other preparations used on smaller numbers of children yielded Schick-conversion rates of 97.8%, 97.7%, 98.2%, and 99.4% respectively. Two preparations, B1 and F, proved thoroughly unsatisfactory, giving rates of only 68.2 and 74% respectively. One of these—B1—was tested in doses of 0.2 and 0.4 c.cm. and of 0.5 and 1.5 c.cm.; the results, however, were no better, the corresponding Schick-conversion rates being 51.9 and 70.7%.

To find out whether the immunity conferred by doses of 0.1 and 0.3 c.cm. was lasting, two schools that had been Schick-tested before and after inoculation were re-Schick-tested thirteen months after the second dose of A.P.T.; 97.7% of the children proved to be Schick-negative. Tests were then carried out on seven schools which had never been Schick-tested before. Of 966 children Schick-tested twelve months after their second inoculation of A.P.T., 91.3% were Schick-negative. Of the positive subjects, two-thirds gave trivial reactions, many of which would probably have been regarded as negative by less exacting observers. There had been no diphtheria in any of these schools after inoculation and practically none in the whole town. The effect of artificial immunization, therefore, can hardly have been augmented by that of latent infection, which has been shown by previous workers to be necessary for maintaining a high Schick-negative rate. For this reason the results we obtained may be regarded with satisfaction.

In the light of our findings, and of those of previous workers, the optimal dosage of A.P.T. for the routine immunization of school children is discussed. Comparatively few exact observations have been reported on the two-dose method, and there is no general agreement on the best dosage to adopt. It is pointed out that any dosage recommended must be a compromise between the immunizing efficiency of the antigen and the tissue reaction to which it gives rise. Provided that in future only preparations of A.P.T. of guaranteed potency are issued, it is concluded that for general use two inoculations of 0.2 c.cm. and 0.3 to 0.5 c.cm. at an interval of not less than four weeks should provide an adequate degree of immunity against diphtheria without prejudicing the success of the immunization campaign by the occurrence of unduly severe tissue reactions. The increase of the first dose from 0.1 to 0.2 c.cm. is recommended mainly on practical considerations, since the observations recorded in this paper show that a primary dose of 0.1 c.cm., when properly administered and followed in not less than four weeks' time by a second dose of 0.3 c.cm., is capable of bringing about an adequate degree of immunity. The optional increase of the second dose to 0.5 c.cm. is suggested mainly to widen the margin of safety whenever this is considered desirable. If, for instance, the A.P.T. has not been stored in the refrigerator or is nearing its expiry date, the larger dose might be preferable.

For routine purposes it is recommended that children should be immunized with two doses at the age of 1 year, and that they should receive a single dose of 0.3 to 0.5 c.cm. to stimulate their waning immunity on entering school at 5 years, and again at the age of 10 years. Except when comparing the immunizing efficiency of different preparations of A.P.T., pre-immunization Schick tests are rarely called for; but Schick tests carried out on a small sample of the children two to four months after inoculation serve as a useful control to the efficiency of the method employed.

We would express our thanks to the various medical officers of health who have afforded us the facilities for making these observations, notably to Dr. Jennings and Dr. Campbell of Oxfordshire; Dr. Sims-Roberts, Dr. England, Dr. Gubbins, and Dr. Spong of Buckinghamshire; Dr. Paterson of Berkshire; and Dr. Tangye and Dr. Blackley of Wiltshire. We are grateful also to Dr. Hobson of Oxford for permission to immunize certain private schools; to Dr. Hartley of the National Institute for Medical Research for the Lf values of the preparations of A.P.T. used and for much valuable criticism; to Dr. Trevan, Dr. Parish, and Mr. Glenny of the Wellcome Physiological Research Laboratories for putting their extensive technical knowledge at our disposal; to Dr. Kingsley Smith, Dr. Fleming, Mr. Steele, and Miss Bryant for occasional help in the field; to Miss Elliott for her unfailing assistance in the collection and analysis of our records; and to our chief technician, Mr. Atkinson, whose constant supervision of the necessary equipment has greatly lightened the practical side of our work.

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MUSTARD GAS LESIONS OF THE EYES

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Interest in the lesions caused by dichlorethyl sulphide (mustard gas) is again aroused by the possibility of its use in the future. The first "gas attack" was made by the Germans at Ypres in 1917, and a number of ophthalmic surgeons became conversant with the immediate results of doses of varying severity. Owing, however, to the difficulty of accurate observation under Service conditions in the last war, and also to the fact that in most cases spontaneous recovery occurred after a variable interval, few detailed data of the clinical pathology and total course of the lesion were available. Interest in the subject dropped, though occasional case histories and speculations as to after-effects appeared between 1920 and 1935. After that period, however, it became clear that cases of recurrent ulceration were occurring among men subjected to relatively heavy doses of mustard gas ten to twenty years previously. Thus the condition of "delayed mustard gas keratitis" came to be recognized as a clinical entity (Phillips, 1940). It is now possible, by correlation of the appearance of these delayed cases with lesions induced in animals in a series of experiments carried out at the Imperial Cancer Research Fund Laboratories and with other human material available at the present time (e.g., in laboratories), to piece together the story of the effects of mustard gas on the human eye (Mann and Pullinger, 1942).

In the first place one can say that these effects depend on the peculiar physical and chemical properties of the gas, on the anatomical situation at which it acts, and on the size of the dose. There is no essential difference other than that of degree between the effects of the vapour and of a splash of the liquid, since very prolonged exposure to vapour will cause damage exactly similar to that produced by liquid. We can therefore recognize grades of the lesion of varying severity, dependent on the size of the dose and characterized by the involvement of certain tissues in a definite order. Broadly, it can be said that the lids and conjunctiva are involved first, that with a slightly larger dose the cornea will show changes—first in its epithelium only and, with a greater dose, in the substantia propria as well—and that with severe doses the limbus is damaged and vascularization of the cornea occurs to a varying degree. It should be of use, in view of the possibility of gas attacks in the present war, to summarize these clinical varieties of lesion, since if they are recognized the prognosis in any given case is rendered much easier, and the sorting out and disposing of cases is facilitated in consequence.

Varieties of Lesion

1. *Cases in which the Conjunctiva and Lids alone are involved, the Cornea remaining Clear Throughout.*—These cases run a mild course, as the total gas received by the eye is very small. There is no complaint of discomfort at the time of exposure, but about six hours afterwards there is burning and smarting of the lids, with some lacrimation. The lids are swollen and reddened and the conjunctiva is hyperaemic. The eyes can be opened voluntarily and there is no complaint of photophobia. The cornea is bright and sight is not affected, so that, except for the discomfort, there is no disability. Such cases clear up spontaneously in four to seven days and do not relapse. It is likely that a number of cases would be of this mild type. In the absence of any known specific antidote it would seem that treatment of these mild cases should be expectant.

2. *Cases in which the Lids, Conjunctiva, and Surface Layers of the Cornea are involved.*—There is no discomfort at the time of exposure and, as in the first group, the complaint is of redness, swelling, and burning of the lids about six hours after. In addition there are lacrimation and photophobia. The presence of photophobia six to nine hours after exposure can, even in the absence of facilities for detailed examination, be taken as a sign of corneal involvement (either superficial or deep), and therefore calls for greater care in treatment and prognosis. If the eye be examined in detail it will be found that, although much swollen, the lids can usually just be opened, when the cornea in the palpebral aperture will be seen to be very faintly hazy, with superficial oedema and epithelial bedewing. There may be a fine punctate staining with fluorescein. The conjunctiva is very hyperaemic. The patient tends to keep the eyes closed for four or five days and then begins to improve. The swelling, hyperaemia, and discomfort may continue for as long as six weeks, but recovery is complete, with no relapses. The patient at the beginning is a casualty, since, though not totally incapacitated, he is unfit for any activity. As the condition here is essentially a superficial keratitis it would seem logical to treat with a mydriatic. Excessive treatment, such as repeated irrigation, is to be avoided. The superficial tissues being somewhat devitalized, any irritant treatment will tend to retard healing, and measures should be restricted to the relief of ciliary spasm and the removal of discharge, if any. Discharge is seldom a marked feature, and secondary infection in these cases is rare. Bandaging, if used at all, should be given up after three days at most. Reassurance is also required, as the patient is apt to think that his sight is severely involved.

3. *Cases in which the Whole Thickness of the Cornea is involved Together with the Limbal Blood Supply.*—These cases are severe and will be total casualties for from two months to a year or more, and in the worst cases for much longer. Even here there is no complaint of discomfort at the time of exposure. Indeed, I have examined one man who in the last war received a splash of liquid mustard and, beyond the sensation of fluid entering the eye, experienced no immediate disability and was able to see for nearly ten hours afterwards. It is important to recognize this in assessing prognosis.

The usual history is of severe exposure, followed in a few hours by intense oedema of the lids with burning and smarting and complete inability to open the eyes. If an examination can be made it will be seen that the conjunctiva is hyperaemic and there are haemorrhages in it. At the limbus on each side in the palpebral aperture there are avascular white necrotic patches in which the conjunctival and limbal vessels are destroyed. There is a band of dense oedema across the cornea in the exposed part. This has a "peau d'orange" surface and stains with fluorescein. The destruction of limbal blood vessels at once places the case in the severe category, but only continued observation will show how severe it is likely to be. The subsequent possible stages are:

(*a*) The lids may remain closed for five days and then the primary oedema of the cornea may subside. Apart from some activity of the limbal loops above and below the triangular white patches at the limbus, vascularization may not occur. The condition then subsides in about two months and does not relapse, though the triangular areas of destruction of limbal capillaries are permanent. These cases show that destruction of limbal capillaries is not enough to lead to vascularization and to prevent recovery of the cornea.

(*b*) If the dose received is larger the eyes may remain closed up to seven weeks, with profuse discharge and intense discomfort. There will be an accompanying iritis, and synechiae

may form if a mydriatic is not used. After the subsidence of the primary oedema of the cornea in three to five weeks, a secondary oedema makes its appearance accompanied by ingrowth of vessels into the cornea from the undamaged region of the limbus contiguous to the triangular white patches of conjunctival destruction. These vessels assume characteristic and fantastic shapes; they show pointed ends, right-angled branches, intracorneal haemorrhages, sudden alterations of calibre, and constrictions cutting off the tips of the vessels, which may form blood islands just under the epithelium, also often of bizarre shapes. These vessels extend into the cornea, the secondary oedema spreading ahead of them. This process may continue for eight weeks or more and may then begin to subside, the vessels narrowing and often in course of time disappearing. A faint nebula is left in the substantia propria, the texture of which appears to be altered, but no further change occurs.

(*c*) In more severe cases, after the initial vascularization has cleared up, there is a relapse within a few weeks; the secondary oedema reappears, more vessels enter the cornea, and the same process of intracorneal haemorrhage, constriction of vessels, and regression occurs. These repeated relapses may continue for a year or more and then cease. Such an eye is left with a fair amount of sight but is in an unstable condition. As the intracorneal haemorrhages subside and the vessels retrogress they leave behind them a scarred area containing intracorneal deposits of fat and cholesterin. This stage of haemorrhages, retrogression of vessels, and degenerative deposits is symptomless and may continue for years. As the sight is fair (6/9 usually) these patients make no complaint, and numbers of them escaped notice between 1920 and 1935. After about ten years, however, such eyes are liable to a degenerative ulceration (delayed mustard gas keratitis). The ulcers are superficial and occur in the deposits of cholesterin where these reach the surface layers. The cholesterin is cast off and the individual ulcer heals with loss of substance after treatment. Hyoscine would appear to give greater relief than atropine in these cases. A number of faceted scars remain which seriously interfere with visual acuity, but as there are no very dense opacities this can be strikingly improved with contact lenses.

This delayed keratitis, which is now seen as a degenerative ulceration, can continue at intervals for twenty-four years or longer after the original exposure. Such relapsing eyes present the characteristic and now well-recognized picture of a transverse band of scarring with cholesterin and fatty deposits, facets, and abnormally shaped blood vessels and blood islands, together with destruction of limbal capillaries in the horizontal meridian and irregular and varicose conjunctival vessels.

(*d*) The most severe cases of all may go on to perforation of the cornea. These are extremely rare, and are probably due to an actual splash of liquid mustard. The initial course is the same as in the other types (*a*, *b*, and *c*), but the initial partial recovery is retarded and the sight poor all the time. The actual perforation, however, may not occur for ten years or more after the injury.

Conclusions

In the present state of our knowledge the effects of mustard gas on the eye are seen to depend on the size of the dose and the structures involved. Prognosis can be based on this. The series of changes set up by the gas tends towards self-limitation and spontaneous recovery, the results being better than the initial condition would suggest, even in severe cases incapacitated for months. It would appear that treatment at present should be symptomatic, since the condition is a chemical injury with possible secondary degenerative changes. The patient should be reassured as to the ultimate outcome.

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Recent gifts by the late Harvey Cushing and Dr. John F. Fulton have increased the medical library of Yale University to 85,000 volumes, making it one of the largest in the United States.

STRANGULATED HERNIA

A CONSIDERATION OF SOME FACTORS AFFECTING THE MORTALITY

BY

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In many surgical fields it is a difficult matter to assess results. It is only too often necessary to apply arbitrary standards of success such as "Good," "Fair," or "Unsatisfactory," and it is evident that results classified in this way are governed to an appreciable extent by subjective factors. It may be for this reason that analytical studies of case series have been criticized as at best inaccurate and at worst misleading.

Whatever the justification for this view, it is difficult to see how such a criticism can be made in a field whose sole aim is to save life and whose standard is nothing more complicated than survival. It will not be disputed that most cases of strangulated hernia will eventually have a fatal outcome if not treated surgically. By the same token, the primary aim in submitting them to operation is to save life. Hence it must be conceded that it is reasonable to use the fact of survival as the criterion of success in this sphere, a criterion which even the most sceptical can hardly criticize as subjective.

The object of this study was to analyse all cases of strangulated external abdominal hernia treated by operation in the surgical unit of the British Postgraduate Medical School in the five-year period 1936-40, with special reference to the fatalities. By so doing, it was hoped to find where the surgical treatment had failed and how such failures could be avoided in the future. The hernias were divided into three types—inguinal, femoral, and ventral—the last comprising para-umbilical and incisional hernias.

Material

During the period referred to, 551 cases of external abdominal hernia were treated surgically. Of these, 448 were simple and 103 strangulated. The types found in the two groups differed considerably in numerical distribution (Fig. 1). Thus in the simple group 77% were inguinal,

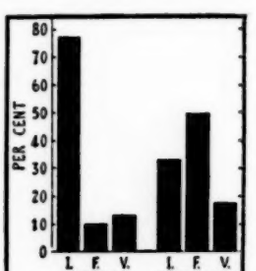

FIG. 1.—Types of hernia met with in a series of 551 consecutive cases (expressed in percentages). It will be noted that the femoral type forms no less than 49.5% of the strangulated group and only 10% of the simple group.

10% femoral, and 13% ventral, while in the strangulated group 33% were inguinal, 49.5% femoral, and 17.5% ventral. This leads to the interesting observation that whereas only 10% of inguinal hernias treated were strangulated, no less than 54% of femoral hernias—more than half—developed this serious complication.

It is true that an uncomplicated femoral hernia in a fat patient may easily escape detection, and that many patients, knowing they have a lump in the groin, seek advice only

when distressing symptoms of strangulation occur. But, even taking these factors into consideration and remembering that the second certainly applies to inguinal hernia as well, the figures strongly suggest that the patient with the untreated femoral hernia is running a considerable risk of strangulation—such a risk, indeed, that should not be lightly dismissed by the doctor called on to give advice.

Age and Sex Distribution.—By far the majority of cases occurred from the fourth to the eighth decade of life, and no less than 57% of the patients were over the age of 60 (Fig. 2). Since simple hernia is not especially a disease of late life, the reason for this is by no means clear. It may, however, be suggested that, apart from a natural reluctance on the part of both patient and surgeon to resort to operative cure in the later age groups, the factors likely to cause strangulation are more commonly at work in the elderly than in the young. Thus the incidence of the various causes of straining, such as coughing, difficulty in micturition, and chronic constipation, is higher in the second half of life. The abdominal musculature, too, tends to lose tone as life progresses. These two factors may well combine to cause the passage of viscera into a hernial sac which, though capable of accommodating its normal content with ease, nevertheless reacts by causing venous obstruction and finally strangulation when a sudden addition is made. Prof. Grey Turner has constantly emphasized that age should not be a deterrent to operative intervention, pointing out that it is often the advanced pathological condition and not the age of the patient which determines a fatal outcome in these cases. So far as sex distribution is concerned the variations in the three types are striking (Fig. 2). Thus no fewer than 31 of the 34 inguinal strangulations occurred in males, whereas the reverse was true in the femoral and ventral groups, 43 of the 51 femoral cases and 16 of the 18 ventral cases being female.

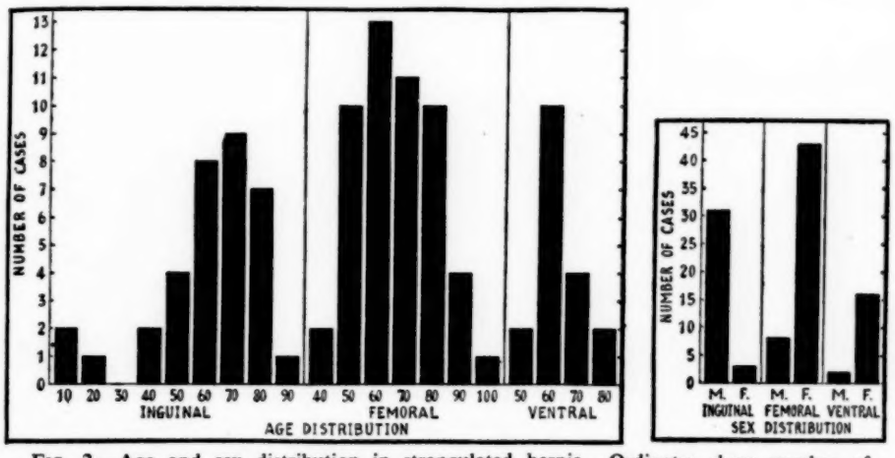

FIG. 2.—Age and sex distribution in strangulated hernia. Ordinates show number of cases; abscissae show age in ten-year intervals. Note that most of the patients were over the age of 50.

Mortality and Cause of Death

Of the 103 patients, 17 (16.5%) died. In two of the deaths, factors divorced from the subject in hand were clearly involved. Thus generalized abdominal carcinomatosis from carcinoma of the head of the pancreas was present in one case, and a sudden cerebro-vascular accident occurred in another case which was progressing favourably. Nevertheless they are included in the mortality figures for the sake of completeness. Three deaths occurred in the inguinal, 9 in the femoral, and 5 in the ventral groups—a mortality rate of 8.8, 17.6, and 27.7% respectively (Fig. 3, B).

The largest single cause of death was some form of pulmonary complication (Fig. 3, A). Seven deaths were classified under this heading, 4 of them being confirmed at necropsy. Five of the 7 deaths were taken to be due to frank bronchopneumonia, the other two being described as post-operative atelectasis. The average age of these patients was 73 years. Peritonitis accounted for 3 deaths, all confirmed at necropsy. The cause of the peritonitis in one case was a pre-operative perforation of the bowel immediately above the constriction ring. In the other 2 leakage occurred from bowel which at operation was deemed viable but which subsequently became gangrenous after having been returned to the abdomen. Myocardial failure, a cause of death always to be regarded with suspicion, was held to be responsible in 2 cases. One of these was confirmed at necropsy, the heart muscle showing fatty changes and the lungs showing patchy atelectasis. The cause of death in the remaining 5 cases was described as due to the effects of intestinal obstruction in 2, renal failure in 1, and the 2 cases already referred to—carcinoma of the pancreas and cerebral thrombosis. The cause of death was confirmed at necropsy in 10 of the 17 fatalities.

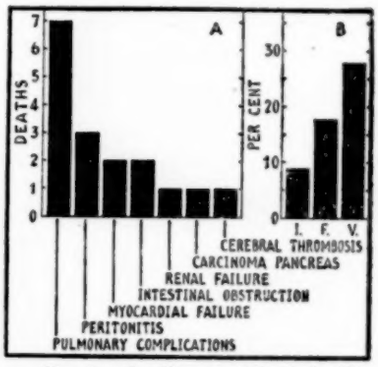

FIG. 3.—A. Causes of death in 17 fatal cases. Note that pulmonary complications were responsible for most of the deaths. In this group the average age was 73 years. B. Individual percentage mortality rate. The relatively benign character of the strangulated inguinal hernia is to be noted.

Factors Involved in the Mortality

Age.—When the age of the patient is correlated with the mortality it will be seen to be a very important factor in the prognosis (Fig. 4). In the whole five-year period not one death from strangulated hernia occurred in a patient under 50 years of age. The average age of the 17 fatal

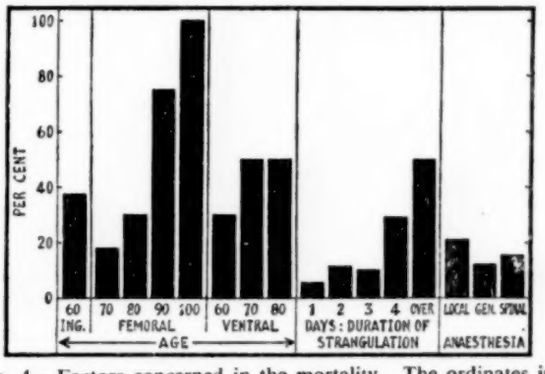

FIG. 4.—Factors concerned in the mortality. The ordinates in all figures are percentages. In the femoral and ventral types the mortality rises rapidly with age, whereas this tendency is not seen in the inguinal type. Mortality rises with the increase of duration of strangulation, and anaesthesia does not appear to be significant.

cases was no less than 68.9 years, with the comparatively restricted range of from 53 to 91 years. In both the femoral and the ventral types the mortality rose progressively with each decade. Thus in the femoral group the mortality up to the age of 60—25 cases in all—was *nil*, while in the seventh, eighth, ninth, and tenth decades it was 18, 30, 75, and 100% respectively. A comparable rise was seen in the ventral group. This tendency was not, however, observed in the inguinal group, the three deaths occurring in the sixth decade, while none of the 17 patients over 60 years died, although no fewer than 8 of them were over 70. It would be foolish to make generalizations from such a small series as this, but this figure does suggest, what is often held, that old men stand operative procedures better than old women. This is further borne out by the fact that of the 41 males in the whole series only 4 died, whereas of the 62 females 13 died. This gives a male and a female mortality rate of 9.7 and 20.9% respectively, figures which may well be significant.

Duration of Strangulation.—Although all the cases in the series were confirmed at operation to be in fact strangulated—that is, that interference with the blood supply of the viscus in the sac was evident—it is difficult to be certain how long pre-operatively the strangulation had existed. The criterion taken was the time interval between the first symptom of the recent attack and the operation. This obviously falls far short of scientific requirements; but it is the one in general use, and to accept a statement from a patient as to when the hernia became tense would be even less reliable, since many of the women in the femoral group are unaware that hernia is present. In this connexion the case of a male patient with a strangulated inguinal hernia may be briefly cited.

This man was admitted with abdominal pain, vomiting, and constipation. No external cause for the obvious intestinal obstruction was evident, and he did not throw any light on the condition, except that he had an inguinal hernia, which he had replaced shortly after the onset of the attack. Laparotomy revealed a reduction en masse, intraperitoneally, of an inguinal hernia which contained coils of the strangulated small bowel. In spite of the fact that the patient knew he had an inguinal hernia he was totally unaware that it was causing his symptoms.

The cases, then, were classified into five groups, according to the duration of symptoms. The first group included those up to twenty-four hours, the second up to forty-eight hours, and so on by twenty-four-hour periods to the fifth group, which comprised those whose symptoms had lasted for over four days (Fig. 4). Irrespective of any other factor, the mortality rose progressively as the duration of symptoms increased. Thus in the first twenty-four hours of the disease the mortality was only 5.7%, while in the group of over four days' duration 8 of the 16 patients died—a mortality of 50%. The intervening groups showed comparable rises in mortality.

Anaesthesia.—Three types of anaesthetic were used in the series: general—usually gas, oxygen, and ether—spinal, and local. The case mortality for these types was 12, 14.6, and 21.6% respectively. This would at first glance suggest that general anaesthesia was safest, a conclusion which is of course wholly erroneous. The figures simply mean that general anaesthesia was used in the good operative risks and that local anaesthesia was the method of choice in the desperately ill patient. In fact, I feel confident that if 37 of the cases had not been operated on under local anaesthesia the mortality in the whole series would have been considerably higher.

Viability of Intestine.—Of the 103 cases, resection of gut was considered to be necessary in 7. In 2 others, already referred to, gut which was deemed viable at operation was subsequently found at necropsy to be gangrenous. Thus a total of 9 cases showed non-viable intestine—a percentage of 8.7. The resection rate rose in step with the duration of symptoms (Fig. 5). Thus in none of the 35 cases in the

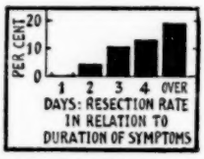

FIG. 5.—Ordinates denote percentages; abscissae, days. Note the steady rise in the number of cases requiring resection of intestine as the duration of strangulation increases.

first-day group was resection necessary. In the subsequent twenty-four-hour groups the resection rate rose to 4, 10.5, 12.8, and 18.7% respectively. Hence a patient with a strangulation of over four days faced a 1 in 5 risk of requiring enterectomy. It is of interest to note that the two cases in which non-viability of intestine that had been returned to the abdomen at operation was found at necropsy were both in early groups—second-day and third-day respectively. It was no doubt for this reason that the surgeon was persuaded to return the bowel to the abdomen. As for the individual types, non-viability was commonest in the ventral group (16.6%), next in the femoral group (10%), and least common in the inguinal group (2.9%). This is a very striking difference indeed, and no reasonable explanation can be offered beyond the fact that the inguinal group were operated upon at a slightly earlier stage than the other two groups. It is further confirmation of the fact, borne out in the other sections, that a strangulated inguinal hernia is a more benign type of lesion than any of the others. As for the mortality of resection, 2 (28%) of the 7 patients died. If the 2 cases of bowel gangrene found at necropsy are included, 4 of the 9 patients showing non-viability died, a mortality of 44%. Hence this series indicates that the presence of gangrenous bowel in a hernial sac reduces the patient's chances of survival to about one-half.

Commentary

There is only one point of view from which to examine operative data if they are not to become a meaningless and wearying collection of figures. It is to regard all deaths as failures of surgical practice and attempt to lay one's finger on the spot where the treatment was ineffective.

With this in mind, what factors could reasonably be held to blame for the seventeen deaths in this series? Two stand out clearly enough to be significant—the age of the patient and the duration of the strangulation. It is evident that as doctors we have little control over the second factor, save in so far as we can teach the public that a hernia, and particularly a femoral or para-umbilical hernia, is not only an uncomfortable companion but may be a treacherous one as well. In the matter of the age of the patient, however, more could be done to save those in the later age groups, who are faced with a mortality of from 30 to 70%. As was shown earlier in this paper, the overwhelming cause of death in these groups is not connected directly with the hernia at all; it is some form of pulmonary complication. It is of the utmost importance, then, that we recognize at the moment of admission of such a case to hospital that, provided the patient is not moribund, what is about to determine the outcome of the case is not the brief sojourn on the operating table. On the contrary, it is the relatively prolonged sojourn in bed afterwards. The restriction of bodily activity involved, added to the already almost basal level at which these patients live, is followed inevitably by a chain of events which will reduce their chances of survival to a minimum. Of these events two are particularly

dangerous. The first is the diminished pulmonary ventilation which follows the reduced respiratory requirements. Areas of atelectasis result which are invaded by pathogenic organisms, leading to a frank bronchopneumonia. The second is the venous stasis, particularly in the lower limbs, which is the result of the loss of two of the physiological factors which normally aid venous return to the right heart—namely, the negative pressure in the thorax which develops in deep respiration, and the propulsive action of contracting muscles in the limbs. As the venous flow slows down, so intravascular thrombosis is facilitated and thrombi are shed, to become enmeshed in the pulmonary circulation and cause scattered pulmonary infarcts, which in their turn are likely to become infected.

Recognizing, then, that it is bodily inactivity and not the comparatively trivial operation involved that will determine a fatal outcome, what can be done to improve matters? Of the measures in use in younger age groups to prevent the foregoing chain of events most are not satisfactory in the aged. Thus the employment of regular breathing and muscular exercises, measures normally as valuable to the abdominal surgeon as are active exercises to the orthopaedic surgeon, is not as a rule successful in the later age groups because of lack of co-operation. An old lady of 75 who has suffered the outrage of being admitted to hospital for an emergency operation is usually too bewildered and frightened to take such an apparently trivial admonition seriously and too absent-minded to co-operate even if she did. The same might be said for the use of any form of mask or tent for the administration of oxygen or carbon dioxide, though not perhaps to the same extent.

The only certain preventive measure for these patients is to regard the operation as a mere incident in the treatment and so plan it that the period of restriction in bed is kept down to the absolute minimum of one day. Nature herself aids us in accomplishing this in that the pain felt from the wound often seems to be much less in elderly patients than in the young. The involuntary exercise involved in getting out of bed into a chair increases the respiratory requirements, the pulmonary ventilation, and the rate of venous return.

Some such regime as follows is suggested in a patient over the age of 70 with a strangulated hernia. After a preliminary gastric lavage, operation is performed under local anaesthesia, with little or no pre-operative sedation. Omnopon or morphine occasionally seems to precipitate mental confusion, which is never completely recovered from, and the latter is to be avoided in an already incooperative patient. After the minimum operative procedure necessary to save life, with no attempt at reconstruction, a pad of wool is placed over the dressing and over all a firm hip spica bandage is applied. If a post-operative sedative is used, paraldehyde or potassium bromide and chloral are to be preferred to opium derivatives. During the first twenty-four-hour period, if there has been much vomiting, the fluid balance may be restored by the intramuscular route much more safely than intravenously.

On the day following operation the patient is got up in a chair for two or three hours, and this time is increased daily till on about the fifth or sixth day he is spending most of his waking hours moving about in it. He is permitted to walk as soon as he feels like it, and is encouraged to do so as early as possible.

This regime must of course be modified if an exteriorization operation has been performed, and is not so easily carried out in strangulated incisional or para-umbilical hernia. But it is applicable to both the inguinal and femoral groups, which make up the bulk of the cases.

Summary

An analysis is presented of 103 consecutive cases of strangulated external abdominal hernia treated by surgical operation, with a mortality of 16.9%.

An attempt is made to discover the significant factors concerned in this mortality.

Of these, the age of the patient and the duration of the strangulation are shown to be the most important.

The management of the condition in the aged patient is briefly discussed.

Acknowledgment is made to Prof. Grey Turner for stimulus and advice, to the surgical staff of the British Postgraduate Medical School, and to Dr. Allen Daley, Chief Medical Officer to the L.C.C., for permission to publish these data from Hammersmith Hospital.

ALLERGY, ENURESIS, AND STAMMERING

BY

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It was with considerable scepticism that the advent of nocturnal enuresis (Bray, 1937) and stammering (Kennedy and Williams, 1938) as allergic manifestations was noted, because so many conditions of doubtful origin, from epilepsy to dysmenorrhoea, have been so regarded. Enuresis and stammering are among the commonest preoccupations of the school medical officer, and it was accordingly decided to investigate the matter. The necessity for further inquiry into the aetiology of enuresis must be apparent to all who read the abundant and divergent claims to treat the disease successfully. Some authors think the cause is purely psychological, others can find a posterior urethritis. Some get the child up every hour or so or give ephedrine, which may keep it awake; others give bromide or luminal to keep it asleep. One advises ignoring the condition, and another makes the boy wash his bed-linen with great ceremony. One insists on the chamber being as handy as possible; someone else wants it right out of the way. Some state that the child will automatically be cured if he sleeps in hospital or with friends; others point out the large increase in enuresis caused by evacuation.

To find the correct incidence of enuresis it is essential to ask the leading question. For instance, out of 2,416 routine inspections a history of enuresis was spontaneously forthcoming in only 33 (1.3%) cases. Nevertheless, out of 200 children specially interrogated enuresis was reported in 14 (7%). It may be remarked that these figures apply only to school children between the ages of 5 and 14. Figures that include children of ages other than these will naturally be quite different, as the incidence of bed-wetting diminishes progressively as the child grows older. Mothers were always asked if the child had at any time since the age of 5 repeatedly wet his bed.

In order to establish the statistical significance of the figures given, the table of Loewenthal and Wilson (1939) was used. If "s" is found after a number it means that the result is significant at the level $P=0.05$. Further, "v.s." means that a conclusion is very significant at the level $P=0.005$. Some of the work done for this investigation had to be excluded for statistical reasons. For instance, an increase in nail-biting among allergics was found; but, considering the numbers in the series, the result was such that, according to the table of Loewenthal and Wilson, chance could not be excluded.

The Investigation

In each instance 200 unselected routine cases acted as a control. A history of allergy in the child or the family

was obtained in 85 (65%) out of 128 bed-wetters. The control figure was 28% (v.s.).

The diseases comprising the allergy in a smaller series than the above 85 cases was: migraine 35 (48%), asthma 17 (23%), hay-fever 13 (18%), eczema 8 (11%). The preponderating influence of migraine will be noted. Careful questioning soon reveals the very large part that sick headache of an allergic nature plays in the minor morbidity of school children. Recurrent headaches, combined with biliousness or vomiting and not due to any other discoverable cause, are necessary for this diagnosis. Also, this condition is markedly hereditary in origin, and can scarcely be diagnosed without a family history of allergy, usually migraine itself, in one of the parents. Pains in the abdomen are often prominent in the symptomatology.

Eczema is, of course, an omnibus term used by the public to describe a large number of skin conditions, allergic or otherwise. For the purpose of this communication eczema in children refers either to a history of infantile eczema or to the presence or history of Besnier's prurigo, which latter condition is perhaps far more common than is generally recognized. Urticaria, although of allergic origin, has been excluded in view of the difficulty of differentiating it, on history alone, from papular urticaria (lichen urticatus), from which most children appear to have suffered at one time or another.

The Influence of Allergy

The next step in this investigation was to find out what form of allergy was mainly responsible for the increased incidence of enuresis. Unfortunately only asthma and migraine could be considered, as sufficient numbers of eczema and hay-fever sufferers were not collected. Enuresis was present in:

14 (7%) out of 200 controls.
5 (6.9%) out of 73 asthmatics.
18 (31%: v.s.) out of 58 children with migraine.

From this it will be seen that the proportion of bed-wetters among asthmatics differs little from that in the general population, whereas there is a great increase among the migraine group, nearly a third of whom wet their beds. This raises the problem whether enuresis actually is a form of allergy or merely a concomitant of recurrent headaches. To probe this problem the incidence of headaches among bed-wetters was investigated. Headaches of any description or cause, if recurrent, were included. The incidence was:

Among 200 controls	26 (13%)
„ 50 bed-wetters	22 (44%: v.s.)

This shows how very commonly headaches of no definite category occur in bed-wetters.

Nightmares.—It is well known that asthmatics tend to have abnormal psychological traits. This holds true for sufferers from migraine as well. These children are often away from school, suffer regularly from digestive upsets, and are often nagged by mothers who have recurrent bad headaches themselves. To illustrate this the occurrence of nightmares among these children was worked out, as nightmares are a not uncommon sign of minor psychological disturbances. Most children get nightmares on occasion, so the mother had to be asked: "Does your child suffer from nightmares more than a normal child should?" The incidence of nightmares was:

Among 200 controls	18 (9%)
„ 73 asthmatics	19 (26%: s)
„ 58 sufferers from migraine ..	17 (29%: s)

Thus there is an increased incidence of nightmares among asthmatics and migrainous children. In asthmatics this would, of course, be expected in view of the nocturnal prevalence of the attacks. No doubt some enthusiast will now consider nightmares to be a further manifestation of allergy. However, it is apparent that this condition—and likewise enuresis—is the result of minor psychological instabilities and thus due to allergy only indirectly.

Stammering.—Following the work of Kennedy and Williams (1938) it was decided to investigate the influence of allergy on stammering. Seventy cases of stammering were encountered, and a personal or family history of allergy was obtained in 46 (66%). The control figure of 200 children gave 28% (v.s.). Kennedy and Williams found allergy to be a factor in 99 out of their 100 cases. Perhaps this was because they considered urticaria in the allergic history, whereas for this paper only asthma, migraine, hay-fever, and eczema were considered.

Discussion

It has long been established that asthmatics tend to suffer from abnormal mental states, usually of a minor nature, and that the asthmatic attack is often brought on by some psychological stimulus. This, however, does not invalidate the essential allergic basis of the condition. Fuller details are given by Bray (1937). It is not so often recognized that sufferers from migraine tend to have abnormal personality traits as often as, or perhaps more commonly than, asthmatics. In popular literature, on the stage, and in everyday experience the headache is that complaint *par excellence* which may be invoked as an excuse to retire from some embarrassing or unfavourable situation. It should therefore cause no surprise that bed-wetting, stammering, and, as demonstrated in this paper, nightmares are commoner in allergic children. Furthermore, there seems to be little necessity to assume that they are direct allergic manifestations, such as would result from the operation of the two essential pathological features of allergy—i.e., spasm of involuntary muscle and increased capillary permeability (Bray, 1937). The fact that allergy is so often transmitted from parent to child makes these psychological tendencies even more apparent, in view of the habit of children to copy and to be influenced by their elders.

It is well known that enuresis tends to recur in successive generations, and Kennedy and Williams (1938) state that this is true for stammering as well. Might not this be due to the hereditary transmission of the allergic diathesis?

Summary

It is confirmed that enuresis and stammering are commoner among allergics.

It is suggested that among the manifestations of allergy migraine is largely associated with these two complaints, and in fact that headaches of various types may be a factor in the aetiology.

This being the case, as well as the fact that nightmares are so common in allergic children, it is suggested that enuresis and stammering are not themselves direct allergic manifestations but result from the abnormal psychological traits of allergics.

The work for this paper has been done during the past three years in Ilford, and I wish to thank Dr. A. H. G. Burton, the medical officer of health, for permission to publish the results and for helpful comment.

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E. C. Faust (*Southern med. J.*, 1941, **34**, 708) says that the malaria mortality in the Southern United States for 1939 was the lowest on record, being 20% lower than for 1938 and 30% lower than the previously lowest rate of the 5-7 year cycle of malaria mortality. Outside the South, Illinois is the only State with a significant number of malaria deaths (38-35) during the three years 1937 to 1939. Many of the Northern and Western States, however, have indigenous malaria.

Medical Memoranda

Torsion of an Appendix Epiploica Simulating Retrocaecal Appendicitis

The following case is of interest in that it is one of the rare causes of the "acute abdomen."

CASE REPORT

A male machinist aged 21 while at work one Tuesday morning was suddenly seized with pain; it began, and remained throughout, somewhat above and external to McBurney's point. It was mild at first, but was continuous and aching, and gradually became more severe until the time of operation (fifty-four hours later). The man continued at work throughout the Tuesday and Wednesday and also on the Thursday morning, when he had to give up. Not until the Thursday morning did he have any pain on walking. There was no vomiting or abnormality of micturition. Constipation was present. The previous history was of good health.

On admission to hospital fifty-two hours after the attack began the temperature was 100° and the pulse rate 110. The tongue was moist and clean. Abdominal examination revealed poor respiratory movement, with pain referred to the right side on deep respiration and on coughing. Tenderness was pronounced and was localized to a position a little above and lateral to McBurney's point. There was no rigidity, and no mass was present. Rectal examination disclosed no tenderness in the pouch of Douglas. A diagnosis of acute appendicitis was made, and it was considered that the appendix was likely to be in the retrocaecal position.

Operation.—What at first appeared to be a gangrenous tip of the appendix turned out to be an appendix epiploica; this had become gangrenous after torsion and was situated on the anterior wall of the ascending colon some 2 inches above the ileo-caecal valve. It was about an inch in length, was dark purple in colour, and had a bead of yellow pus exuding from it at one point. There was no free purulent fluid in the peritoneal cavity. The mass was excised, leaving a raw area on the colon wall which was later invaginated. A normal appendix was also removed. The abdomen was closed without drainage. The patient made an uneventful recovery.

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Local Treatment of Impetigo with Sulphanilamide

Cuilleret (1937a) reported favourably on the local application of 5% carboxy-sulphamido-chrysoidine in glycerin and water in impetigo. Later in the same year he (Cuilleret, 1937b) and Merz (1937) used a 10% sulphanilamide ointment. Since then many favourable accounts have appeared, mostly on very small series of cases. No investigation using a control series has been reported, and no bibliography of the subject has been published.

CASES UNDER REVIEW

The present series consists of 69 consecutive cases of impetigo. Alternate cases were treated with 10% sulphanilamide paste applied twice daily after the removal of all scabs. Some cases hung fire after an initial improvement, and the treatment was completed with eau d'alibour (solution of zinc and copper sulphates) or a 1% solution of gentian violet. In the control series all the scabs were removed and treatment was begun with equal parts of Lassar's paste and ung. hydrarg. ammon. dil. This was followed by alibour water and/or a 1% solution of gentian violet.

The bacteriology of the last 62 cases was investigated. The media used were blood agar and blood agar containing 1 in 300,000 parts of gentian violet, which inhibited the growth of staphylococci but not of streptococci. From 16 cases haemolytic streptococci (with or without staphylococci) were grown.

The time in days was noted between the beginning of treatment and complete cure. Those showing a white scaliness of the skin were not regarded as cured until this had disappeared. It will be observed from the table that cure was effected more quickly in the cases treated with sulphanilamide than in the controls.

	Treated with 10% Sulphanilamide Paste	Controls
Total No. of cases	34	35
Average length of treatment	18 days	24 days
No. with haemolytic streptococci	7	9
Average length of treatment	17 days	24 days
Average time for disappearance of streptococci	10 days	13 days
No. without haemolytic streptococci	24	22
Average length of treatment	18 days	22 days

DISCUSSION

The apparently excessive length of treatment required for cure was due to the long time the men had had impetigo before this treatment started—it averaged 26 days. In the adult impetigo seems not to be a self-limiting disease. Had the sulphanilamide paste not been used till it was certain that improvement had ceased, the period of treatment would have been shortened. It was the only method used in 20 of the cases.

It seems that sulphanilamide paste is an advance on the other methods of treatment employed. Marshall (1941) finds it more effective as a powder than as an ointment; a paste combines some of the advantages of both methods of application. Perhaps sulphathiazole might give better results, as it is effective against staphylococci as well as against streptococci. Since completing this series it has been found that quicker results are obtained by choosing a remedy individually for each case and changing it during treatment as dictated by the progress and stage of the lesions.

Colebrook's (1941) observation that disappearance of the streptococci does not coincide with healing of the skin is borne out fully. The nature of the additional factor delaying healing is not known.

My thanks are due to Colonel Colebrook, who suggested this investigation; to Majors Somerford and Smith, who gave me facilities for carrying it out; to Majors Whitehead and Varvill for the bacteriological investigations; and to the officer commanding the military hospital for permission to publish the results.

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As the result of a study of eleven patients treated by sulphanilamide or its derivatives, A. A. Grimaldi (*Rev. Med. Cienc. afin.*, Buenos Aires, 1941, **3**, 62) concludes that these drugs, irrespective of the quantities administered, affect spermatogenesis under some conditions, but that the effect is of slight importance and always transitory.

Reviews

CANCER OF THE FACE AND MOUTH

Cancer of the Face and Mouth: Diagnosis, Treatment, Surgical Repair. By V. P. Blair, M.D., S. Moore, M.D., and L. T. Byars, M.D. (Pp. 599; illustrated. 50s. net.) London: Henry Kimpton. 1941.

Many books upon surgical subjects must be considered as academic in their design; technical procedures are described, and often beautifully illustrated, as they may be performed upon the operative surgery body, so that the inexperienced reader might scarcely recognize the operation when he first saw it performed upon the living subject. The same sort of criticism applies to the recording of results, which may be misleading rather than informative. The outstanding feature of *Cancer of the Face and Mouth*, by Blair, Moore, and Byars of St. Louis, is that it avoids the academic approach and is essentially a true clinical record. Here we find no revolutionary ideas of treatment but an admirable common-sense attitude to the whole subject, without undue bias towards any particular aspect.

For the most part the book consists of a well-annotated photographic record of the progress of typical, and real, cases from the time of the original diagnosis to the ultimate result. Such photographs carry conviction to the reader in a way that academic description cannot do; but, lest the clarity of the technical aspects should suffer as a result, the latter half of the book, under the heading "Operative Technique," is occupied by a large series of plates with clear line drawings illustrating the successive stages of the treatment of the actual cases portrayed in the first section. In this manner the reader gets almost as clear a conception of the whole case as if he had been present during the treatment. This is obviously of great value to the young surgeon who is confronted with his earlier cases in this important branch. In view of the large number of illustrations the text is not very extensive, but it is nevertheless adequate and always presents a well-balanced view.

In addition to the face and mouth proper there are chapters on the maxillary antrum and the salivary glands, while plastic reconstruction of course receives attention. The role of irradiation in the treatment of these growths is carefully assessed, and a chapter on "Follow-up Statistics" gives the initiate a good idea of what may be achieved by the various forms of treatment. It is therefore a book well worth perusal, and then keeping for valuable reference when the difficult or unusual case arises.

CARDIOVASCULAR DISEASE

Synopsis of Diseases of the Heart and Arteries. By George R. Herrmann, M.S., M.D., Ph.D., F.A.C.P., Professor of Medicine, University of Texas. Second edition. (Pp. 468. 25s. net.) London: Henry Kimpton. 1942.

This new edition of this book is a compact survey of diagnosis and treatment of cardiovascular disease. In the earlier chapters it deals fully with clinical methods, and succeeding sections give a useful summary of the radiology of the heart and electrocardiography. The chapters on disturbances of myocardial function and those on failure of the circulation are good, and in particular precise detail is given concerning the technique of treatment. While its significance is obvious, the term "anginal heart failure" will seem strange to many English readers. It certainly broadens the concept of heart failure as a progressive deficiency in the function of the heart whatever its origin, but it must be admitted that the syndromes of circulatory failure and angina pectoris are so distinct that it is perhaps a pity to link them by the term "failure." It is refreshing to find Dr. Herrmann, among so many other orthodox cardiologists, referring to the debatable entity of chronic myocarditis as "chronic myocarditis (so-called)"; it is to be hoped that the time will come when this term as applied to a process which is usually ischaemic will find no place either in the text or in the index of a book on cardiology.

Much work has been devoted to the production of this manual, which, for its dimensions, contains a vast amount of information presented in a readable and attractive way; in general Dr. Herrmann has dispensed with references, and no bibliography is included although names and dates are quoted at a number of places in the text. It might have been better either to give a selective but exact bibliography or to avoid altogether references to old and new publications and researches. While the reproductions of electrocardiograms are not uniformly good, the manual is provided with many excellent plates of pathological specimens and photomicrographs.

MARCH OF SCIENCE

The Development of the Sciences. Second Series. By Dystein Ore, Frank Schlesinger, Henry Margenan, John A. Timm, Chester Ray Longwell, Lorande Loss Woodruff, Walter Richard Miles, John Farquhar Fulton. Edited by L. L. Woodruff. (Pp. 336. $3.00 or 18s. 6d. net.) New Haven: Yale University Press; London: Oxford University Press. 1941.

This series of lectures, delivered by leading authorities under the auspices of Yale University, traces scientific history from the days when the sky was the only calendar and the number of our fingers inculcated the natural advantages of the decimal system. This ambitious scheme is admirably carried out, though perhaps some of the chapters will rather tax the capacity of the general reader for whom it is designed. The broad impressions gained from its perusal may be summarized thus: The progress of knowledge has not been continuous but intermittent, depending partly on changes in "the climate of opinion," but also because any one science may have to wait on developments in some other field. From the latter cause of delay mathematics has suffered least because it is the most abstract. Yet Greek mathematics remained pre-eminently geometrical because the system of numbers was cumbersome until the introduction of Arabic numerals. Later the invention of logarithms, as Kepler said, tripled the life of an astronomer. Lagrange (1736-1813) was of opinion that mathematical research was nearly exhausted by his time, and was as wide of the mark as those who, in the 'nineties of last century, maintained that no more great medical discoveries were to be anticipated. For after him mathematics have become increasingly abstract and have proved to be a most powerful unifying principle; each science approaches accuracy the nearer it reaches mathematical expression. Hence the temptation to apply them prematurely, which is a dangerous pitfall in the biological sciences. Physics, too, has become increasingly abstract, and we no longer accept Lord Kelvin's dictum about models: "We bow before the inevitable, discontinue the use of models and proceed modestly with an abstract formalism."

Discontinuity is perhaps most obvious in astronomy. It was unfortunate that the great authority of Aristotle was cast against the ideas of Pythagoras, for this delayed the advance of astronomy for twenty centuries. Three of these centuries divided Hipparchus from Ptolemy, and there was a much longer interval before the advent of a worthy successor in Copernicus. The early history of astronomy is closely interwoven with that of mathematics, as is its recent history with that of physics.

The inquiring mind of the Greeks soon began to ask "why" rather than "how," and philosophy took precedence over observation. The Romans preferred studies

of direct practical value; the territorial expansion and cultural degeneration of their empire exhausted the powers of scientific inquiry. The coming of Christianity abated curiosity about the physical universe, but stimulated benevolence, so that, in the early Middle Ages, medicine, in its care for the sick, became the progenitor of the sciences, and the history of medicine and biology became inextricably interwoven. Prof. J. F. Fulton calls attention to the many physicians who made great advances in other branches of science, such as geology, chemistry, and physics. Indeed the versatility of genius stands out clearly in these pages. To Leonardo da Vinci's many achievements it appears we may add that he was the first scientific geologist. Gauss (1777-1853), whose name has recently been revived in connexion with magnetic mines, excelled in mathematics, physics, astronomy, and geodesy. Helmholtz (1821-94) was physician, physiologist, and physicist alike. It was his brilliant lecture in 1847 on the doctrine of conservation of energy that enthroned materialism for a comparatively brief reign.

Though history is more than "the prolonged shadows of a few great men," this book bears testimony to the enormous influence individuals can exert. One final generalization of special interest in the present phase of thought may be adduced. Despite Francis Bacon's contention, however closely one investigates and measures, there is always a gap at the end to be jumped by the imagination. By faith Harvey saw the capillaries which Leeuwenhoek, with the aid of his microscope, discovered by sight.

HEALTH EDUCATION

A Modern Approach to Health Education. By a Committee appointed by the Ling Physical Education Association under the chairmanship of Miss Helen Drummond, M.A. (Pp. 32. 1s. 6d.) University of London Press, Ltd.; St. Hugh's School, Bickley, Kent.

This pamphlet, issued under the aegis of the Ling Physical Education Association, furnishes guidance in the making of educational health schemes. The authors, who construe health in the widest sense of the word, believe that a right understanding of healthy living fosters individual responsibility and leads on to social service. Health teaching in school should not, they think, be tacked on to domestic science, biology, or even physical training. It should run, like a golden thread, through the child's whole curriculum. Schemes are outlined for ages ranging from infancy, pre-school life, the junior and senior schools on to adolescence. One scheme, for the last two groups, is set forth in some detail. Six alternative approaches to the subject are also presented. With the ample choices offered, scheme-makers should find the pamphlet suggestive of ideas.

Notes on Books

Dr. S. WATSON-SMITH'S account of *The 1936 Outbreak of Typhoid Fever* in the Bournemouth area brings out clearly the mechanism of milk-borne infections. This epidemic was traced to a single dairy, where a small stream was infected by sewage from a house where a "carrier" lived. As water from this stream was used to wash milk containers, previous pasteurization alone might not have been sufficient to check the epidemic, and yet it was remarkably successful. An interesting fact is that whereas the infected milk was supplied to no fewer than 10,000 persons only 518 cases were notified, though it is suspected there may have been 1,000. Of the notified cases almost exactly 10% were fatal. As in all milk-borne infections, children suffered disproportionately. Dr. Watson Smith's lucid clinical account shows that the epidemic followed the classical descriptions with remarkable fidelity. It has been printed for the author at Bournemouth by the Triangle Printing Works.

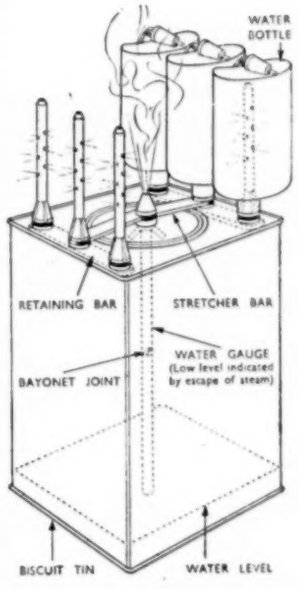
No. 19 of the *Proceedings of the University of Otago Medical School* has been published at Dunedin under the editorship of Prof. J. B. Dawson. It consists of the Wilding Memorial Lecture, 1940, on "Women and National Survival," by Dr. C. E. Hercus, and a number of reprints, mainly from the *New Zealand Medical Journal*. The volume can be consulted in the Library of the British Medical Association.

Preparations and Appliances

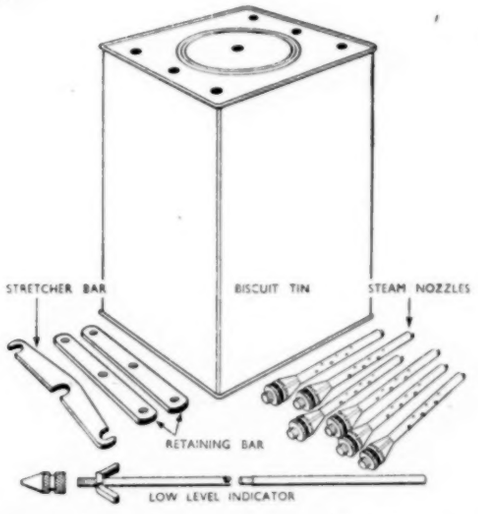
STERILIZER FOR WATER-BOTTLES

Dr. J. G. FAYRER HOSKEN writes from Uley, Dursley, Gloucestershire:

The drawings reproduced herewith are illustrations of a water-bottle sterilizer which in its primitive state was used by me in the last war. In Gallipoli, where the water shortage was at one time acute, the Royal Engineers at my suggestion soldered six tin tubes into the top of a biscuit tin to form an efficient boiler; the method of use is shown in the diagrams. The tin half filled with water was sufficient for the bottles of one company. Very little fuel was required to bring it to the boil on account of the light metal used in such containers. This was also an added advantage since the scanty scrub could be utilized without giving rise to a tell-tale smoke column. Such a contraption could of course be but short-lived and unsuitable for mobile warfare.



The portable fittings have been designed so that the biscuit tin, with its many advantages, can still be used and rapidly adapted for the purpose indicated. These fittings could be made considerably lighter than those from which the illustrations have been drawn, and when fitted in a wooden box should not get damaged easily. I found that after five minutes' boiling the bottles were too hot to handle, in spite of the felt cover. The cork bung difficulty was unsolved.



The stretcher bar has been added to stiffen the top and prevent the weight of the bottles from producing a sag in the thin metal. The central tube acts as a rough water-level indicator, since the steam will be seen to escape from the top as soon as the water level sinks below the bottom of the tube.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY MARCH 14 1942

DIPHTHERIA PROPHYLAXIS

To use a medicament fruitfully one naturally wishes to know how to choose a good sample of the drug, what dose to give and how often, and what the result will be. Accumulating clinical experience must answer the last question. The other answers are supplied by the *British Pharmacopoeia* for most well-established "medicines." Data for new-comers are incorporated as rapidly as possible in the convenient successive addenda. The prophylactics have not yet quite found themselves. The British Army prescribes that typhoid vaccine must be made from "smooth" or virulent strains, which will in the rabbit generate serum protecting mice against mortal doses of bacilli; time-lag has not yet permitted the inclusion of these requirements in the *B.P.* Diphtheria formol-toxoid is officially recommended in the doses given on the manufacturer's label.

The valuable paper by Fulton and others, working with Prof. G. S. Wilson, completed in our present issue, goes far towards supplying the required data for the diphtheria prophylactic alum-precipitated toxoid (A.P.T.). In the immunization of some 30,000 children this team has shown that by the use of an appropriate dosage of a proper prophylactic at suitable intervals it is easy to change 97 or even 99% of children from the Schick-positive to the negative state. They have thus supplied abundant justification for similar claims of workers (mainly British) made during the past six years. Most of the findings are based on fully analysed groups of from 2,000 to nearly 5,000 children. The results obtained lend themselves to easy summary. The natural Schick-positive rate ran from 92 to 100% at ages 1-3, to 70% at 14, the end of the school period. Girls had a notably higher positive rate than boys. Yet they proved to be no more immunizable (unlike the groups of men and women immunized against tetanus by Marvell and Parish[1]). Only 1.2% of children under 10 showed a pseudo-reaction; a control test with heated toxin is scarcely worth doing below that age. With a routine dosage of 0.1 and 0.3 c.cm. of A.P.T. four weeks apart, local reactions were not troublesome on the average, though the authors frankly state that a certain proportion of severe reactions occurred. They encountered only one "sterile abscess." (It should be possible to find some other and less alarming term for these small sterile fluctuant swellings, which trouble the patient so little.) Of the children originally Schick-positive 2,722 were tested eight to sixteen weeks after immunization. Four commercial samples of A.P.T. provided conversion rates from Schick-positive to negative of 97 to 99%. These samples contained from 23 to 50 Lf units per c.cm. Two other preparations, 13 to 15 Lf per c.cm., converted only 52 to 74%, nor did a two- to five-fold increase in dosage materially raise this rate. When tested twelve to fourteen months after immunization 91.3% of the children were still negative. The authors point out that if the dosage is made too large in aiming at a maximum antigenic effect the reaction rate may rise undesirably. Their compromise appears to be a reasonable and happy one, and the recommendation of the preparations made by the method described by Barr and his co-workers[2] seems well justified.

Because of the possible error in injecting so small a quantity as 0.1 c.cm., the possibility of loss from leakage, and of error from inadequate mixing of the contents of the bottle, the authors recommend that the first inoculation in large campaigns should be 0.2 c.cm. and the second, given at least four weeks later, should be 0.3 or 0.5 c.cm., "provided that in future only preparations of *guaranteed potency are issued*" (italics are ours). If this course is given at the age of 1 year, it is advisable to give a single further dose of 0.3 c.cm. at the age of 5 when the child enters school and again at the age of 10. Routine pre-immunization Schick tests are not called for; post-immunization Schick tests carried out after two to four months on small samples of the children injected serve as a useful control. The authors regard the failure of two samples of A.P.T. to give higher conversion rates than 52 to 74 as striking. The findings are in truth disturbing and lend some support to the energetic complaints made by Bousfield.[3] The confidence of doctors in active immunization built up slowly by much tedious effort over many years was perceptibly shaken recently by the low conversion rates reached in several areas. Presumably the samples of A.P.T. used had passed the official tests; if so the ordinary reader would suggest that poor-grade preparations—recently described by our contemporary as a.p.t.—should not be licensed for sale. The *Pharmacopoeia* approves the principle that the testing of biological materials should depend on comparison with an official sample. So far as we can trace, the notable advocate of this method, Prigge,[4] in 1938 did immunize guinea-pigs with any sample of diphtheria prophylactic under test and with the official prophylactic. He compared the effects by injecting mortal doses of toxin into the immunized animals, basing the value of the sample on the result of the comparison. We believe this method was in official use in Germany, but Fulton and his colleagues state that a solution of the problem on these lines presents great technical difficulties. He and his four colleagues have made a most timely contribution to public health. Informed dogmatism of this kind will be welcome, equally to the busy administrator intent on large-scale campaigns, and to the physician without the leisure to study the literature and choose minor modifications suitable to particular conditions.

1 *British Medical Journal*, 1940, **2**, 891.

2 *Lancet*, 1941, **2**, 301.

3 *Med. Officer*, 1941, **66**, 157.

4 *Dtsch. Med. Wschr.*, 1937, **63**, 1478.

THE HEALTH OF NEW YORK CITY

With commendable promptitude Dr. John L. Rice, Health Commissioner, has again issued a fairly full preliminary report for 1941 on the first day of January, 1942. The estimated mid-year population was 7,521,000, New York being the biggest administrative urban unit in the world. Its statistics are therefore of special interest and value. Its population is rapidly ageing. In 1900, 16% were over 45 years of age; in 1940 the percentage had risen to 27. In spite of this unfavourable age distribution the crude death rate in 1941 fell to 9.9 per 1,000, the lowest on record. Contributing to this were new low records for infant mortality, puerperal mortality, pneumonia, diphtheria, and scarlet fever. The infant death rate was 30.8 per 1,000 live births, the neonatal part of which accounted for 22.0. These low rates are notable, but they are not exceptional in the large cities of America and the British Dominions. The rate for the first year of life is now less than one-third of that prevailing in the second decade of the century. The neonatal rate in New York, as elsewhere, has fallen less, being just under two-thirds of the rate for the second decade. Death in the first four weeks of life is therefore assuming greater relative importance. With stillbirth and puerperal mortality it depends largely on antenatal and obstetrical care. The decline in the puerperal mortality rate is very striking. Until 1936 it had never been less than 4.7 per 1,000 live births; it had reached 6.4 in 1933. In 1937 it fell to 4.0, and the decline has continued to the exceptionally low figure of 2.2 in 1941. There is some similarity to this in the behaviour of pneumonia. Its mortality had been falling since 1930, but the decline has been sharp since 1937. In that year it was 89 per 100,000 living; by 1941 it had dropped to 45. Dr. Rice gives the credit for this gain to specific therapy. The coincidental decline in mortality from pneumonia and from puerperal causes, which has been observed elsewhere, suggests that the discovery of sulphonamides is largely responsible. It may become apparent, however, when comparable statistics are available, that New York and other large administrative units in America have gained more than we have by better organization of the new therapeutic facilities.

New York's comparative immunity from diphtheria is well maintained. In this great city only 405 cases and 9 deaths occurred in 1941. In a smaller population during the third decade of the century the average annual numbers of cases and deaths were 10,685 and 684. The death rate has declined from 42 to 0.6 per 100,000 in this short period of time. In five health centre districts with populations ranging from 180,000 to 340,000 not a single death has occurred for four years. Equally remarkable is the fall in the killing power of measles, although the incidence in 1941 was exceptionally high (79,637 cases). If it may be assumed that notification has been uniformly maintained during the last eleven years, the fatality rate has fallen from 0.57% in 1930-2 to 0.03 in 1939-41. Something similar has happened with whooping-cough, whose fatality rate has dropped from 2.87 to 0.68% in the same short time.

Tuberculosis, which had been falling steadily since 1930, showed a slight rise in mortality from 48.6 per 100,000 in 1940 to 49.3 in 1941. The death rate for the pulmonary form (44.7) was up by only 0.2, whereas that for non-pulmonary forms (4.5) increased by 0.4, a much greater proportion. Dr. Rice thinks this argues against the influence of wartime stress, but no other explanation is offered. It is pointed out that some deaths (about 10% of those recorded) occurred outside the city and are not included in this report. The hitherto rapidly rising death rates from diabetes and cancer appear to have been halted, these causes accounting for rates of 4 and 160 per 100,000 respectively, but diseases of the heart, arteries, and kidneys, and apoplexy together continue to grow as a cause of mortality, accounting for a rate of 464 per 100,000. When the deaths from cancer, diabetes, and cardiovascular-renal conditions are added together the total amounts to 49,994, or almost exactly two-thirds of the 74,553 deaths from all causes during 1941. This is a measure both of the ageing of the community and of the changing province of public health.

ETHER CONVULSIONS

One of the disadvantages of ether anaesthesia is the abnormal activity of the voluntary musculature which may occur. Three forms of this activity are recognized. The fine tremor of the limbs frequently seen under light narcosis may be annoying to the surgeon but is innocuous to the patient. It can usually be stopped by altering the position of the affected limb or by deepening the plane of anaesthesia. Slow rhythmical movements of a particular group of muscles may also occur and may synchronize with every third or fourth breath. They can persist in spite of deep anaesthesia, and may be extremely irritating if they happen to include the part of the body being operated upon; but again they cause no harm. "Late ether convulsions," on the other hand, start by twitching of the facial muscles and may spread to the whole body, so that the patient appears to be in the throes of an epileptic fit. Their serious import can be judged by the fact that the mortality of all recorded cases up to 1936 has been estimated as 23%.

The causation of this condition remains one of the most baffling problems in anaesthesia. All kinds of factors have been blamed, including impurities, overdose, carbon dioxide lack or excess, oxygen lack or excess, diminution of serum calcium, over-atropinization, heat-stroke, and the presence of a particular type of streptococcus in the throat. Unfortunately not one of these conditions has always been present in every recorded case, and even the ether itself is not essential. While it is true that in most of the cases diethyl ether was the anaesthetic used, convulsions have occasionally occurred with divinyl ether, chloroform, nitrous oxide and oxygen, and with local analgesia. At the present time it is believed that convulsions are most likely to befall a young, febrile, dehydrated patient anaesthetized with warm ether vapour in a hot, damp atmosphere when a severe surgical stimulus is being applied. The part that heat plays in this condition is obscure. Most anaesthetized patients tend to lose heat during operation, and every effort is rightly made to minimize this. It appears, however, that patients who are dehydrated and who have pyrexia from acute infections may have a rise in temperature under ether anaesthesia if they are kept in a hot atmosphere with a high relative humidity, as shown by the approximation of the readings of the dry- and wet-bulb thermometers. This temperature rise may be accentuated by the extensive use of mackintosh sheeting and by the

inspiration of ether vapour heated considerably above the atmosphere in the theatre. In the hyperpyrexial state which ensues, a sudden stimulus such as traction on the peritoneum may initiate convulsions. Unfortunately for the heat-stroke theory some cases cannot be explained by it. For example, typical ether convulsions occurred in a perfectly fit athlete who was undergoing an operation for the removal of a foreign body from his elbow-joint; no mackintoshes were used, and the theatre was cool and dry. It must be remembered that temperatures taken immediately after an attack may be misleading, because of the intense muscular activity which has occurred. As a prophylactic measure it would seem wise to avoid ether in young pyrexial patients, but if this is impossible fluids should be given before operation; the wet-bulb thermometer reading in the theatre should not exceed 70° F., and the surgeon should be asked not to use rubber sheeting. Open ether is preferable to warmed vapour from this point of view.

If convulsions have begun, a reversed Trendelenburg position with the head up should be adopted if possible; the face and limbs should be sponged with cold water, and the common carotid arteries should be compressed for a second or two. Should the convulsions still persist, a short-acting barbiturate should be injected intravenously with great caution. As soon as this controls the muscular movements sufficiently, intubation should be carried out unless this has previously been done, as artificial respiration may become necessary and is much hampered if laryngeal spasm is present. It might be thought that induction of anaesthesia with an intravenous barbiturate might confer an immunity from ether convulsions, but this does not appear to be the case.

SERODIAGNOSIS OF SYPHILIS

It is almost axiomatic that the diagnosis of syphilis lies very largely in the hands of the pathologist, because in a substantial proportion of cases the clinician is dependent for accuracy of diagnosis on the results of serum tests. Syphilologists are naturally critical, but the average practitioner is apt to accept every pathological report as gospel and without demur. Few members of the medical profession are in a position to evaluate the standards of the laboratories to which they send their specimens, and there can be little doubt that, so far as the serodiagnosis of syphilis is concerned, there are many laboratories in this country whose results would not stand critical examination. The reason for this is clear. The average laboratory which deals in general pathology performs relatively few serum tests for syphilis over a given period, and has little or no opportunity for checking its results; moreover, often for time- and labour-saving purposes, many pathologists tend to introduce variations into the technique of the tests they carry out. It is obvious that the results obtained from such laboratories cannot be expected to attain a high degree of both specificity and sensitivity.

In the U.S.A. some six years ago a Committee on Evaluation of Serodiagnostic Tests for Syphilis was set up to check the standard of performance of tests in the various State laboratories; a comprehensive review of the whole field has been published.[1] The plan was to send blood specimens taken from syphilitic and presumably non-syphilitic donors to various laboratories, which would then test them in parallel with control groups. By this means it was possible to estimate the degree of accuracy attained by any particular laboratory. In the first instance the identity of the participating laboratories was hidden by the use of code designations, but recently these have been disclosed.[2] This latter method has the great advantage of indicating to the physician which laboratories and which types of test are the most reliable; it also stimulates laboratories to improve their standards and provides a check on results. The tests most favoured in the U.S.A. are the Eagle and Kolmer complement-fixation tests, and the Kline, Kahn, Hinton, and Eagle flocculation tests. There can be no doubt that the stimulus provided by the six-years "evaluation" has done much to raise the standard of performance, and any of the above tests may be expected to yield satisfactory results in the hands of a really competent pathologist provided he keeps closely to the technique advocated by their respective authors.

Something similar has been done in this country though on a rather smaller scale. Laboratories which are on the "approved" list of the Ministry of Health are supplied from time to time with batches of sera, which they test in parallel with the Ministry's own serologist. By this means it is possible to rate the standard of performance of any given laboratory, and as a result to take any necessary steps to raise those standards when they fall below the desired level. Serum testing, therefore, under the V.D. scheme may be considered satisfactory, but unfortunately the number of tests carried out by approved laboratories can represent only a relatively small proportion of the total number. Many tests are carried out in laboratories which can have little claim to a really high standard of serological performance, and there must be an enormous number of quite unreliable results reported—many of which are accepted without question. It does seem that there is much to be said for limiting the types of test performed—the Wassermann and Kahn appear to be the most popular in this country—and for concentrating serum testing in a comparatively few laboratories. The diagnosis, tests of cure, and exclusion of syphilis are matters of such importance both to the State and to the individual that none but the highest standards should be acceptable, and every laboratory performing serum tests for syphilis should make it a point of honour to maintain these standards.

MORE ANTISEPTICS FROM MOULDS

The fact that some micro-organisms produce antiseptic substances—acting, of course, only on other unrelated species—has recently advanced from the sphere of purely academic interest towards that of practical application. The best known of these substances, penicillin, has been put on the therapeutic map by the work of Florey and his colleagues[3] to which we referred last year, although difficulties of production still bar the way to extensive clinical trial. For some years past Dubos and others have been studying the antibacterial substances which can be extracted from cultures of *B. brevis*: one of these, now known as "gramicidin," has been shown to exert its action *in vivo*. Another example is actinomycin, isolated by S. A. Waksman and H. B. Woodruff[4] from a streptothrix which they have named *Actinomyces antibioticus*. All these micro-organisms have been identified either by chance or by selective breeding out from material containing an unknown and complex flora. As two of them are fungi it might well be worth while to study related species systematically with the object of finding others behaving similarly. This task has in fact been undertaken by H. Raistrick and his colleagues, and the work has been in progress for some years, in the course of which no fewer than fifty products have been isolated from cultures of many more different moulds: they appear to be relatively simple compounds,

1 Hindrichsen, Josephine. Supp. 14 to Venereal Disease Information, U.S Public Health Service, Washington, D.C., 1941.

2 *J. Amer. med. Ass.*, 1941, **117**, 1167.
3 *Lancet*, 1941, **2**, 177.
4 *J. Bact.*, 1941, **42**, 231.

for the molecular structure of many of them has been established, and in some cases they have also been synthesized. Raistrick and others[5] have now described the isolation and properties of two of these compounds. Citrinin is formed by *Penicillium citrinum*, and penicillic acid—a quite different substance from penicillin—was first detected many years ago in *Penicillium puberulum*, found in mouldy maize, but has been obtained for this work in larger quantities from *Penicillium cyclopium*. When a suitable culture medium is used the yield of these substances is as large as 2 grammes per litre, and the processes of extraction and purification are simple; it appears also that the resulting products are stable. The investigation of citrinin and penicillic acid for biological activity has so far only reached the stage of simple *in vitro* tests of power to inhibit bacterial growth in broth. This power is possessed by both to a degree which ranks them below penicillin in activity against certain bacteria, a degree, nevertheless, which ought to be effective therapeutically should their application prove feasible. Citrinin acts almost exclusively on Gram-positive species; penicillic acid has also the power to inhibit the growth of the Gram-negative intestinal bacteria.

It was shown by Florey and his colleagues in various ways that penicillin exerts its bacteriostatic action not only in plain broth but in the presence of high concentrations of serum protein. Whether this is also true of citrinin and penicillic acid remains to be seen; from their similar derivation and behaviour an affirmative answer is to be expected. It is an even more important point in favour of penicillin that it can be shown in many ways to be singularly harmless to the living cells of the body; this is another character which awaits investigation in these two new compounds, and unfortunately it is not one which can confidently be predicted, because some antiseptics of microbic origin are highly toxic. Raistrick and his colleagues are careful to point out that until the necessary biological tests have been made it should not be concluded that citrinin and penicillic acid will take their places as chemotherapeutic agents. They emphasize, nevertheless, that if such tests should prove favourable these compounds have an immense advantage over penicillin in that their large-scale production would be a comparatively simple matter. Their yield per litre of medium is actually two hundred times greater, and extraction is by a simple process. It is also noteworthy that their molecular structure is known, and although neither has yet been synthesized a study of the biological properties of related synthetic compounds might well yield interesting results.

WHAT IS A "TRUBY KING" BABY?

This question is the heading for the first chapter in *Mothercraft*, by Mary Truby King, now available in an eighth edition,[6] and its answer contains certain important considerations for the medical practitioner. The simplest reply is, "A baby who is completely breast-fed till the ninth month and then weaned slowly on to humanized milk." All honour is due to Truby King for his great insistence upon breast-feeding and for his attempt to organize a baby's routine so as to secure "a joy from morning to night to himself and all the household." Where doubt and difficulties creep in is in regard to so-called humanized milk. This is made with something dangerously designated as "fresh milk," water (sometimes with lime water added), a product called "karilac," and another called "kariol." Recipes for humanized milk, given on various pages of Miss Truby King's book, show a variable composition: milk 4½ oz., water 5½ oz., karilac 2½ level teaspoons, is one; and milk 20 oz., water 15 oz., karilac 2 level tablespoons, is another. Neither would appear to conform exactly to the percentage composition of human breast milk, and the latter example, recommended for a baby of 10 months, is too dilute. The reason given for such dilution is the plain statement attributed to the founder of the system that "great excess of protein overtaxes both the digestive organs and the kidneys," but there is no piece of scientific evidence to support this. Two serious objections may be raised to this whole business of "humanized milk." First, it is far too complicated, as set out in this book, for the ordinary working-class mother; and, secondly, the dilute milk feeds recommended have no support from the children's specialists of the world outside a small circle of what are called "the medical advisers of the Truby King (Plunket) Society." A study of the most recent annual report[7] of the council of this society in New Zealand raises certain uncomfortable points. An essential feature of the Truby King system is the use of a special sugar (karilac) and a special oil emulsion (kariol), which are made by the Karitane Products Society. Now in the accounts presented in this report it appears that the Karitane Products Society contributed in the year 1940-1 a sum of £1,156 6s. 2d. "towards medical adviser's salary and travelling expenses." Other receipts by the Plunket Society over the same period include a grant of £2,000 and a donation of £200 from the Karitane Products Society towards the salaries of the teaching staff. No one can deny the immense value of the work done by the Plunket Society in New Zealand, and no small credit in that excellent record is due to the medical advisers, past and present. But it is clearly undesirable that any medical practitioner should be preaching and teaching a method of infant feeding which involves the use of products profits from the sale of which contribute substantially to his or her salary. The answer to the question posed at the beginning is therefore more complex than would appear at first sight. There is so much good in the mothercraft taught by the Plunket Society and kindred societies in other parts of the world that it seems a pity it should be linked with a method of using milk which has the support of only a small minority of paediatricians.

HISTONE-ZINC-INSULIN

Protamine-zinc-insulin is found by some to be too slow in its action and too prolonged, as it lasts longer than twenty-four hours; further, its point of maximum effect may come during the night. Hagedorn tried histone and insulin, but could not produce a stable compound. Histone is obtained from the thymus. It has now been found that a satisfactory preparation can be made by the addition of zinc. The preparation contains 40 units insulin, 1.3 mg. histone, and 0.08 mg. zinc. It is buffered to *p*H 7.0, contains 0.25% phenol, and 1.6% glycerin to make it isotonic. The action of this solution has been compared with that of protamine-zinc-insulin and with unmodified insulin in twelve diabetic patients, and it has been found that histone-zinc-insulin is more rapid than protamine-zinc-insulin and almost prevents any rise in the after-breakfast blood sugar. Its action is most apparent between two and twenty hours after injection, being complete in twenty-two hours. Barnes, Cuttle, and Duncan[8] claim that a larger number of patients can be kept free from glycosuria after a single morning injection of histone-zinc-insulin than by any other preparation.

We learn with deep regret that Sir Henry Brackenbury died suddenly on March 8. A letter by him on one of the many subjects that continued to interest his active mind appears in our correspondence columns this week. Sir Henry's great services to the B.M.A. and the profession will be recorded in a later issue.

5 *Chem. Ind.*, 1941, **60**, 828; 1942, **61**, 22, 48.
6 Simpkin, Marshall Ltd. 1941. (4s.)
7 From the registered offices of the Society, 346, George Street, Dunedin.
8 *J. Pharmacol. exp. Therap.*, 1941, **72**, 331.

ABDOMINAL INJURIES IN MODERN WARFARE

THE BRADSHAW LECTURE

For the Bradshaw Lecture to the Royal College of Surgeons of England Rear-Admiral G. Gordon-Taylor took as his subject "Abdominal Injuries in Modern Warfare."

His remarks were based on a series of over 600 operations for abdominal injury in casualties from Dunkirk, in the Navy and the R.A.F., but largely in air-raid casualties among civilians. In addition, though not included statistically in the review, there were cases of injury to the belly which had been received in circumstances more or less related to total warfare—for example, the black-out had played no small part in determining abdominal damage of this kind. Again, the catastrophe which befell the individual in peace might, of course, equally overwhelm him in war, and the series included cases of perforated peptic ulcer operated on during air raids and in the woods near Dunkirk beach, and cases of strangulated hernia which had been admitted to hospital during air raids and had taken their turn for operation with persons injured by high explosive.

The idea that the immediate mortality from abdominal injuries due to enemy action must be very high was not substantiated by the facts from the post-mortem room, which, in one particular series, showed that the number of immediate deaths due to abdominal injury represented no more than from 8 to 10% of the total cases. "Experience demonstrates the fact that, despite the stout-hearted efforts of rescue squads and the courage and devotion of ambulance drivers in cities, desperate or moribund abdominal cases do not crowd the doorsteps of our hospitals, and it becomes difficult to escape the conclusion that, in Britain at any rate, abdominal casualties demanding surgical aid are few." Operations for abdominal casualties in the Forces also appeared to be infrequent in this war.

Penetrating Injuries

Most of the penetrating injuries in the series had been caused by fragments of bomb casing; the largest fragment to be removed in a successful case was the size of a walnut. The wounds produced by bullets did not differ greatly from those sustained in the last war, and the recovery rate for persons injured by revolver bullets was flattering to the operating surgeon. The destructive effects of flying glass were now familiar. Often coils of intestine were cut to pieces inside the belly. In some cases more than one type of missile was responsible for the damage; thus glass and bomb fragments might be found with stones and metal. Viscera might also be damaged by in-driven bone fragments, although the missile itself did not penetrate the peritoneal cavity. Only two cases of bayonet wounds (both recovered) were included in the present series.

The experience of this war confirmed that of the last concerning the occasional immunity of viscera in penetrating wounds of the abdomen. Moreover, wounds of the hollow viscera had been known on occasion to heal spontaneously without surgery. The importance of the buttock wound as a potential avenue to the abdominal cavity could not be stressed too strongly; the wound of entry was found in this region in about 20% of all cases of abdominal injury. It was most important that the minute wound should not be overlooked, and one of the most useful surgical instruments in the reception room was a pair of large shears to cut away the patient's clothing and permit him to be examined all over. A patient with a large wound of the abdomen or a wide loss of the abdominal wall seldom recovered, though remarkable cases of recovery had been recorded.

The general condition of the wounded patient varied widely. In some the degree of shock was extreme, but others were able to walk and even to help their fellows. Secondary haemorrhage had been an infrequent phenomenon in this war, and few cases were met with in this review. Primary haemorrhage was a predominant cause of death in the early hours of wounding or in subparietal injury.

Prognosis in Stomach Lesions

The prognosis in lesions of the stomach was better than in the last war, when the recovery rate was 36.3%. In the present series it was 60%. Acute dilatation of the stomach had been strikingly frequent; not only had this phenomenon been a complication of a penetrating injury of the abdomen, but it had also proved a common and sometimes intractable sequel of operations and a complication of injuries to other parts of the body. It had occurred with contusions of the chest or in association with a fractured pelvis or ruptured bladder.

Three men suffering from perforated peptic ulcer were known to the lecturer to have been successfully evacuated from Dunkirk; two were operated on abroad and one on this side of the Channel. Prolapse of the abdominal viscera made the patient a bad surgical risk. The recovery rate in operations on prolapsed non-perforated small intestine in this war was about 50%; when the small gut was not only extended but also injured the mortality was about 80%. In prolapse of the large bowel the prognosis was very grave, but patients had recovered even when the large bowel had been prolapsed and lacerated. The number of perforations of the bowel in the intestinal cases investigated had varied from 1 to 20. Suture had been shown to be associated with better results than resection, and of the resections of the bowel in patients who had survived most had been of short lengths.

Wounds of the duodenum had a sinister reputation in previous wars. Successful operations for duodenal injury had been carried out by several surgeons in the present conflict. In injuries of the rectum in this series the recovery rate was 52%—a great improvement on the 35% of the last war; but the recovery rate in penetrating wounds of the bladder was slightly lower than the 40% of 1914-18. The spleen had been frequently damaged by penetrating injury and also by falls in the black-out.

"Immersion blast" was known to naval surgeons in the last war, but more particular attention had now been drawn to it. Clinically the cases varied much in degree, from mere ileus to severe peritonitis after rupture of small or large intestine. The youngest "case" in which death occurred from blast was a 6 cm. foetus with a bruise on the abdomen. A pregnant woman died shortly after receiving injuries in an air-raid shelter, and a typical appearance of blast injury was found post mortem in the uterus.

Percentages of Recoveries

Assessing the general prospects of recovery, Surgeon Rear-Admiral Gordon-Taylor said that despite the gravity of the wounds and the frequent association of multiple injuries, about 50% of patients with abdominal injury due to enemy action for whom operation was possible had survived. The present military situation allowed no information as to the percentage of all abdominal casualties for which operation had been possible, but on the home front most of the cases reaching hospital alive were given surgical aid. The percentage of recoveries for injuries to stomach, small intestine, rectum, and spleen was actually higher than in 1914-18, and for large-bowel injuries it was the same as it was then. In his series of 163 cases which underwent operation for injuries of the large intestine, 65 recovered (40%), and in 119 in which operation was carried out for abdominal injury confined to the small intestine there were 75 recoveries (64%). Exteriorization operations on the large intestine had done badly. Sulphonamides locally and orally had proved of inestimable value. Transfusion of blood or blood derivatives had been employed on a liberal scale and made a host of cases operable. Far larger amounts of blood had been given than in previous wars—as much as 11 pints before operation became possible.

Surgeon Rear-Admiral Gordon-Taylor concluded with the following words: "It seemed opportune and desirable to familiarize the scattered surgeons with the results that may be attained, and are in fact being attained, in the abdominal surgery of total warfare. Impressions are fallacious. The collection of these facts and the conclusions emanating from their study have both surprised and thrilled me with their unexpected excellence. It is an added joy to me that some of the miracles to which I have referred, when men, women, and babes

have been rescued by surgery from certain death, have been wrought by some of my own former surgical assistants, pupils, and friends. As in the war of twenty-five years ago, this College has advanced surgical knowledge and craftsmanship, and the labours of those over whom you, Sir, preside still steadily promote those arts which benefit all mankind."

This was the sixtieth Bradshaw Lecture, and the fourth to deal with the surgery of war, the others being by Sir George Makins in 1913, Sir Anthony Bowlby in 1915, and Sir Charles Ballance in 1919.

Correspondence

Medical Supply of Radon

SIR,—There is a natural desire among all those who have responsibilities in the matter of radium or radon supplies to maintain as far as possible the high standard of practice in radium therapy which had been reached before September, 1939. There is, for obvious reasons, less actual treatment now with radium, but more is being done with radon, which, however, carries with it the same risks as radium in treatment.

The National Radium Commission and the Medical Research Council are largely responsible for the radium used as the source of radon at two of the Radon Centres, both of which I have the honour of supervising. It has been agreed that radon will only be supplied to those hospitals which are on the official list of the National Radium Commission. Hospitals not on that list, and which desire to obtain supplies, should obtain from the National Radium Commission a questionary which, when completed, should be sent direct to the Commission, c/o Westminster Hospital, London, S.W.1. In due course the hospital will be told whether its name has been placed on the official list and what steps should be taken to obtain radon.—I am, etc.,

SIDNEY RUSS,
for the Medical Research Council Radon Centre and Hospitals Radon Centre.

London, W.1.

Tuberculosis and the War

SIR,—In the *British Medical Journal* of February 28 there is a leading article on "Tuberculosis and the War" in which, in regard to the early diagnosis of pulmonary tuberculosis, reference is made to the reluctance of people to be examined, and to the difficulty of introducing into this country legislation for the compulsory examination of seemingly healthy people. The context is in reference to wholesale *x*-ray examination, but of course these points are equally applicable to physical examination.

There are at the present time thousands of people—male and female—being compulsorily examined by medical boards for admission to the fighting and defence Services, and they are in the very age groups in which pulmonary tuberculosis is most likely to be found incipient. Obviously the more experienced the examiner is in the diagnosis of this disease the greater will be the likelihood of discovering early cases in a curable stage, even without the assistance of *x* rays. A unique opportunity of tracking down early cases of pulmonary tuberculosis thus now presents itself which will not obtain in peacetime.

I mentioned these points when I recently made application to the Central Medical War Committee in regard to service on any of the three medical recruiting boards within easy reach of this district. I have been a tuberculosis officer for over 25 years, but had to give up this work on account of the onset of a very severe illness (not tuberculosis). I cannot expect ever to regain anything like my former full working capacity, but I could do a few hours' sedentary work on two or three days a week. I have been informed that the only way in which use could be made of my knowledge of tuberculosis nationally would be for me to become again an officially recognized tuberculosis officer, when cases which might be considered by medical boards to be doubtfully tuberculous might be referred to me for an opinion.

The Central Medical War Committee will have access to the records of enrolment of all medically qualified persons, and if, as I think probable, a number of retired practitioners with special experience in tuberculosis work are found, it would seem worth while modifying the regulations which appear to ban the use of their knowledge, in view of the present concern over the questions of inhibiting pulmonary tuberculosis and conserving medical man-power.—I am, etc.,

W. B. MARTIN.

Old Colwyn.

Anaesthesia: The Man and the Machine

SIR,—Sir James Walton, in his informative article on war surgery of the abdomen (February 21, p. 247), states his preference for open-drop ether anaesthesia. One must therefore assume that he has had very expert anaesthesia of this type, whilst it is probable that when he has worked with intravenous or local anaesthetics his anaesthetist has not been so skilled in these methods; hence his lack of enthusiasm for them. I believe it to be wrong to rely overmuch on any one anaesthetic agent, for it is not so much this as the skill of the person using it that counts. "Choose your anaesthetist, not your anaesthetic," is a very sound rule for surgeons, and an anaesthetist regularly accustomed to giving intravenous and local anaesthetics but relatively unfamiliar with open-drop ether would probably satisfy Sir James entirely with the former two and not with the latter. When the surgeon is as rapid a worker as Sir James is well known to be, the duration of anaesthesia is correspondingly short, and the disturbance of the patient by the anaesthetic minimal. However, with prolonged operations, especially where deep anaesthesia is required, the harm done by an anaesthetic may not be negligible, and sometimes open-drop ether should be avoided for this reason, if other methods are available and also people experienced in handling them. Another point is that open-drop ether would not be the anaesthetic of choice if the operating theatre were heated by means of an open fire, as an improvised operating theatre might well be.

It is difficult to understand Sir James's condemnation of anaesthetic apparatus on the score that the whole responsibility is thrown on the machine. This certainly is not so; no one would suggest that with the modern car the responsibility for safe driving lay on the machine; the human skill of the driver is of first importance, and so it is with the "driver" of an anaesthetic apparatus. Sir James does state that in his experience no machine could take the place of human skill. I agree; it was never intended to do so, and should not be used with that idea in mind; but a machine can and does permit refinement which makes for better anaesthesia than is possible with open-drop ether alone.—I am, etc.,

FREDA B. BANNISTER.

Oxford.

War Surgery of the Abdomen

SIR,—I should like to refer to some points raised by Sir James Walton in his excellent lecture on "War Surgery of the Abdomen." His condemnation of the "intubation form" of after-treatment will be welcomed, I am sure, by many of your readers. At the same time I think Sir James is too strong in his condemnation of transfusion in general, and in his objection to continuous drainage of the stomach. Blood for blood is a good maxim where shock is due to haemorrhage, but where it is not clear that haemorrhage has taken place and the patient is seriously shocked then I think plasma transfusion has its place. For example, cases of severe burns and crush injuries, as well as cases of acute obstruction of the small intestine, all show a haemoconcentration due to diminution of blood plasma volume, and all will be benefited by plasma transfusion. If loss of blood plasma is allowed to become progressive, a stage may be reached from which there is no recovery, for "white" haemorrhage may be even more dangerous than red.

In cases of repeated vomiting where the stomach and intestine are distended, I believe continuous drainage by a Ryle or Miller-Abbott tube is more beneficial than occasional lavage of the stomach. In these cases there is great loss of chloride, and I think it will be acknowledged that chloride is more quickly and more efficiently replaced by means of saline given intravenously than by any other route. As a rule the majority of patients do not object to this form of treatment, particularly when they are made comfortable with morphine or one of its derivatives. The importance which Sir James attaches to the giving of morphine for the relief of pain after operation is worthy of note. Coming from one of his experience it should convince those who

strongly object to the use of the drug. No doubt, as he points out, some of these objections are due to the mistaken belief that the drug causes ileus, whereas, if anything, it improves the tone and peristalsis of the intestine.

For more than a year now I have followed Sir James's practice of applying sulphonamide powder to abdominal wounds in infected cases, and have also used the powder (sulphapyridine) within the abdomen, and feel definitely that the improvement in results obtained was attributable to it.—I am, etc.,

London, W.1 MICHAEL SMYTH.

Mule Spinner's Cancer

SIR,—In your issue of December 13, 1941 (p. 851), a review of my book on *Mule Spinner's Cancer or Epithelioma of the Skin in Cotton Operatives* stated that "its contents should be fully known to all whose work brings them in any way in contact with the cotton industry—masters and men as well as the medical profession." Masters and men took over 800 copies on terms which enabled me to offer one free of all charge to 290 doctors in practice in the cotton towns. This I did by circular to each one, and you printed a note in the *Journal* of February 7 (p. 208) repeating and extending the offer. Only twenty-eight of the 290 offers, and eleven of that of the note, have been accepted. The lack of medical interest in the subject is deplorable, for there is no doubt that if the profession will join with masters and men in dealing with the disease on lines suggested in the preface of the book much needless suffering and many avoidable deaths which now occur amongst cotton spinners will be averted. The offer of a free copy on application for one to the University Medical Library, Manchester, 13, still holds good.—I am, etc.,

Manchester. E. M. BROCKBANK.

The Teaching of Anatomy

SIR,—I should like to ask a question of Prof. Lucas Keene (February 28, p. 306) and of those teachers of anatomy who agree with her when she says, "I would stress that the student, during his Second M.B. course, should dissect the whole body as he does at present." Why? I have never received a satisfactory or logical answer to this question. Now that these teachers agree, or are tending to agree, that they should "cease to lecture or to examine on matters of topographical detail" and that "the anatomist of to-day attaches little value to detail and is much more concerned to teach the anatomy of the living body and the principles which are inherent in the relationships between structure and function," as Prof. T. B. Johnston declares (p. 306), or, in the words of the writers of the original letter on this subject, that there should be "elimination of the study of topographical minutiae which are unlikely to be of any practical value to the general practitioner," it seems desirable to repeat the question and to ask for a definite answer.

When I proposed at the General Medical Council to modify the regulation which compels *every* student to dissect the *whole* of the cadaver, thereby allowing each medical school to settle its own curriculum in this regard, I had all the professors of anatomy against me, but not all the surgeons. The Conference of Representatives of Universities and Colleges reported that after devoting earnest attention to the point they were not unanimous. The B.M.A. Committee on Medical Education reported that in its opinion "dissection by the student of every part of the body is unnecessary," and in observations asked for by the G.M.C. stated that it "adhered to the opinion that no real advantage is gained by requiring every student to dissect the entire body" while agreeing "that a sound knowledge of the anatomy of the whole body is necessary, but this can be effectively attained by other methods in association with a limited course of dissection." Further, if it is maintained that this requirement is *essential*, does it not logically follow that every student should also dissect at least those parts of the body of a second adult which differ sexually from those of the first and the bodies of children at various stages of growth?

It is clear that in this letter I am not referring to students working for higher diplomas with a view to becoming surgical specialists.—I am, etc.,

Mudford. HENRY B. BRACKENBURY.

SIR,—I have read with much interest the views of present-day anatomists on the teaching of their subject and the place it should occupy in the curriculum, the more so as I have long held the conception now so ably expressed by Prof. A. B. Appleton and his colleagues (February 7, p. 196) and subsequent writers. Though I realize that my views on the teaching of anatomy can now have little interest for the present generation, I find that in 1930 in the Rockefeller Foundation's *Methods and Problems of Medical Education* I expressed the opinion that anatomy is a study of the living, not the dead, and that anything that had to do with the study of man—physical anthropology, anthropometry, growth and development, heredity, neurology, and human behaviour—is a fit and profitable field for anatomical research. The broader view arouses the interests of the student and quickens his powers of observation. He can thus apply the results to living human beings wherever they present themselves: in hospital, the waiting room, or the world in general. In most universities—at least in my time—medical education appeared to be so designed as to place principles and practice at opposite poles, so that when the student reached his practice he had forgotten his principles.

I also have a vague recollection of another article of mine on the teaching of anatomy which appeared in the *British Medical Journal*, though the details escape me.

If, then, both ancient and modern anatomists appear to agree on the necessity for some drastic reorganization in the relations of anatomy to medicine, why is it that the solution escapes us? For the present generation I cannot answer, but in my time our efforts at reform were frustrated by three major obstacles: (1) The necessity of teaching to the examination requirements of other and, as we in our arrogance thought, more stupid people; (2) the multiplicity of the editions through which late Victorian textbooks passed and still do, thus perpetuating the traditions of a bygone age; (3) the complete divorce of the anatomist from his hospital and clinical colleagues. I trust Prof. Appleton and his collaborators may succeed where his predecessors have failed.—I am, etc.,

Bristol. RICHARD J. A. BERRY.

SIR,—Since the correspondence on this question has become generalized to the extent that there is evidenced a very real expression of opinion that some reforms are necessary in the teaching of anatomy, I would ask permission to amplify my earlier letter (February 21, p. 271). Five teachers of anatomy initiated the correspondence by suggesting that the teaching of "unnecessary minutiae" of human structure should be eliminated. They also made proposals for the addition of certain subjects to the contents of the anatomical curriculum. I expressed my whole-hearted agreement with the general trend of their letter, but pointed out that it was not easy to decide what were the "unnecessary topographical minutiae" that should be omitted from our teaching. This difficulty remains.

My attitude is not that of a reactionary who would advocate that the acme of anatomical knowledge should be assessed by the ability of a student to identify and "side" a carpal bone by palpation in his trouser pocket. That stage of estimating knowledge is passed early in the career of the teacher, even if it may be rather more prolonged in the case of some examiners. The doubt that remains in my mind is the ability of the critics to come to any agreement on which structural details are of real importance and so should be taught to students, and which are unimportant and so should be omitted. I fancy that the subsequent correspondence has justified this attitude. In his letter (February 28, p. 307) Mr. Wilfrid Adams writes: "A good doctor does not need . . . to know the cranial foramina and what each transmits." But later he says: "*Per contra*, there are directions calling for accentuation," and instances the significance of the "foramen (ovale) of the skull in relieving victims of the torture of tic douloureux." Should we accept this dictum as a guide in our teaching we might decide to eliminate all reference to the cranial foramina with the exception of the foramen ovale, and on this particular one we should lay especial emphasis. But I fancy it would not be very long before some other authority put in a plea for the foramen rotundum, and still others might think the stylomastoid foramen worthy of mention.

With subtractions from the burden of details of structure piled upon the medical student I am in whole-hearted agree-

ment; but I think that the reformers have not fully appreciated the difficulties involved in the business. Moreover, I feel that these difficulties are incapable of solution by correspondence in the medical journals. With additions to the anatomical curriculum I am not concerned here save to support Prof. Lucas Keene's plea that much useful teaching could be added if the course in biology for medical students concerned itself more with the basic principles of life and less with the details of structure of lower forms.—I am, etc.,

Manchester. F. WOOD JONES.

Haemoglobin of Pregnant Women

SIR,—I have been greatly interested in the correspondence under the above heading. Dr. Kerr Henderson (Feb. 21, p. 273) has very wisely drawn attention to a physiological factor which many workers appear to neglect when making their estimations, and his statement that hydraemia may account for a lowering of the haemoglobin to 10 gms. per 100 c.cm. will be readily agreed to by many who have studied this particular problem.

There seems to be little doubt that there is a considerable increase in blood volume during pregnancy, but much of the work done to demonstrate this increase and to put it on some calculable basis has been rendered inaccurate through failure to take into account the continued increase in weight during pregnancy. The most accurate data are probably given by Dieckman and Wegner (1934), who have shown that while great individual differences are to be expected—a few showing no change and a few actually showing decrease—the average increase over all cases at term is in blood volume 23% and in plasma volume 25%. This change they designate an "oligocythemic hypervolemia."

Rowntree, Brown, and Roth (1924) found that the average decrease in blood volume eight to ten days after delivery was 1,100 c.cm., whereas the average loss at delivery was 300 c.cm. An increase in the total volume of blood would be expected in pregnancy because of the foetal circulation. Taking the foetal volume as 850 c.cm., this together with a loss of 300 c.cm. would at first sight account for the differences in blood volume between pregnant and parturient women. Most estimations of the blood volume have been made by the dye method, but no trace of the dye has yet been found in the placenta or foetus, and in the absence of data relating to transference of dye from maternal to foetal blood increased maternal blood volume cannot be satisfactorily explained on this basis.

Dieckman and Wegner have also shown that there is a definite decrease in the haemoglobin per 100 c.cm. of blood. The maximum decrease, amounting to 15%, is from the twenty-sixth to the thirty-fifth week. The total amount of haemoglobin, however, shows an average increase of 13%, although individual cases show a marked gain during pregnancy and a retention of much of this gain post partum. The total cell volume shows an average increase of 20%, which is even greater in many individual cases. The increase in plasma volume is distinctly greater than the increases in cell volume and haemoglobin. Therefore these constituents show a relative decrease and an absolute increase.

To be certain that a pregnant woman is anaemic would require not only the usual estimations of haemoglobin and red cells to be made but also estimations of blood volume changes throughout pregnancy. Moreover, to be exact these estimations would require comparison with similar estimations made immediately before pregnancy, otherwise a pre-existing anaemia would not be taken into account. There are good reasons for believing that pregnancy itself is not responsible for any degree of anaemia in women, and evidence is accumulating in support of these. Fullerton's work on this subject deserves wider recognition, and his view that pregnancy simply brings to light a pre-existing anaemia is one which will be shared by most clinicians who have investigated this particular aspect of the problem.

Mackay (1931) has shown that the aetiology of anaemia in the infant does not depend on the existence of a similar condition in the mother, and that the ante-natal administration of iron to the mother is without effect on the infant. If there is one fact which emerges from the investigation of low haemoglobin readings in the ante-natal clinic, it is that such readings cannot always, or perhaps often, be explained in terms of iron deficiency in the diet, and the poor response to iron therapy goes some way towards substantiating this.

In the absence of any exact criteria for the determination of anaemia in pregnancy one is justified in making the diagnosis in the presence of the look of general debility, pallor of mucous membranes, and poor living conditions, even when the haemoglobin is considerably above 100 grammes per 100 c.cm., and in this respect one might appropriately quote here the statement of Witts, made in concluding his Goulstonian Lectures: "Anaemia must be studied in the patient, and not merely in a droplet of his blood. The erythron does not work in isolation, but in close dependence on the other organs of the body, and in subordination to the whole. A blood picture, or indeed a marrow picture, is only a symptom; it may appear as the result of very different causes, and it demands for its explanation the whole history and present state of the patient."—I am, etc.,

Greenock. JAMES BAXTER.

REFERENCES

Dieckman and Wegner (1934). *Arch. intern. Med.*, **53**, 71, 188, 345.
Mackay (1931). *Nutritional Anaemia in Infancy*. Medical Research Council, p. 98.
Rowntree, Brown, and Roth (1924). *The Volume of the Blood and Plasma*, p. 188.

SIR,—Dr. W. Kerr Henderson's letter (February 21, p. 273) seems to miss certain points in connexion with this problem.

First, he refrains from discussing the comparison which Drs. Kay and Alston made between their pre-war and wartime estimations. Secondly, most workers recognize that there is an anaemia apart from the hydraemia. Fullerton's paper in the *Journal* (1936, **2**, 577), referred to by Dr. Henderson, is preceded in that same issue by one by Dr. W. C. Smallwood (on page 573). This paper discusses very thoroughly the whole question, and demonstrates the improvement by iron supplementation of the diet on the haemoglobin content of the blood, in experimental rats, in women in pregnancy, and in the infant.

The whole question is very carefully considered in Garry and Stiven's review of the human dietary requirements in pregnancy and lactation (*Nutr. Abstr. Rev.*, 1936, **5**, 855), but three papers are worthy of quotation here. Coons (*J. biol. Chem.*, 1932, **97**, 215) found 15 mg. of iron per day was the minimum to maintain a balance between intake and loss; Ohlson and Daum (*J. Nutrit.*, 1935, **9**, 75) found 14 mg. per day was insufficient, and Toverud (*Acta paediat.*, 1935, **17**, Suppl. No. 1, 131) found the same for 15 mg. Macy and Hunscher (*Amer. J. Obstet. Gynecol.*, 1934, **27**, 878) estimated 20 mg. as desirable, and finally one notices that Tisdall and his colleagues (*J. Nutrit.*, November 9, 1941) used 24 mg. in the interesting experiment they have published on supplements in pregnancy.

I am afraid Dr. Henderson has misquoted or misunderstood me in one respect. One will rarely, if ever, see a child born anaemic, or imperfectly calcified, or showing obvious signs of malnourishment. The metabolism of the foetus and pregnant woman are so balanced that moderate shortage causes her first to deplete her own stores, then to show signs of actual anaemia, decalcification (teeth and bones, especially after lactation), and malnourishment; then the foetal stores are depleted (without obvious clinical signs); and, finally, extreme shortage—practically never obtained in this country—will cause anaemia, etc. The foetus scores at the mother's expense.—I am, etc.,

A. ST. G. HUGGETT.

Haemoglobinometry

SIR,—The technical difficulties experienced by Mr. A. H. Walters (February 7, p. 201) may be divided into two groups. In the first are those arising from the expression of results of Hb estimations in terms (such as "Hb 80%") which limit their capability of interpretation to individuals cognizant of the scale in which they are expressed. To workers lacking this "key" these figures are obviously devoid of significance and can only be treated as such.

The second group comprises difficulties arising out of varying standards for the average Hb content when that factor is required for calculation of colour indices. The average Hb content is a figure which, since it varies according to the statistical range employed in its calculation, can never be other than "arbitrary" when employed outside the community from which the statistics were derived. The earlier haematologists each had his own conception of this factor and naturally calibrated his own type of haemoglobinometer conveniently with this in view. Extensive investigations have since determined the normal *range* of Hb content and cell count, which information is available in the textbooks. Although the instruments

invented by these haematologists are still in popular use, utilization of the chemical or other principles embodied in their haemoglobinometers does not necessarily commit us to the adoption of any of the individual standards of normal associated with them. Thus the principle used by Sahli is still employed by many who have discarded his standard in favour of one which has been found to come within the normal range in the light of further research. It is quite permissible to recalculate any colour index, if we are doubtful of the standard which may have been employed, utilizing the Hb content and cell count which are practically always presented contextually.

No difficulties due to use of colour indices should arise now that normal ranges of Hb content and cell count are available. In laboratory practice the use of cell measurements has, of course, supplemented the inferential method of orientation of types of anaemia by C.I. alone.—I am, etc.,

E. R. WEBSTER.

Typhus

SIR,—If the typhus fever which is now called "louse-borne" be the same fever which was practically endemic in Glasgow up to about 1880, Mr. J. Johnston Abraham (February 21, p. 271) will find confirmation of his view, that overcrowding is the main cause of the spread of typhus and of its greater incidence in winter, in a memorial volume of the writings of the late Dr. T. B. Russell, who was M.O.H. for Glasgow at one time. He says that Dr. Gairdner, in 1856, when typhus was epidemic, found that 8% of the houses visited were overcrowded, and that the epidemic incidence varied in different districts almost in exact proportion to the overcrowding discovered. Certain houses in Glasgow were ticketed according to their cubic capacity and the sanitary inspectors had the right of night inspection of these houses. Dr. Russell said: "We regard the constant exercise of this right of supervision as our main protection against typhus."

The memorial volume mentioned was edited by the late A. K. Chalmers and published under the title *Public Health Administration in Glasgow*.—I am, etc.,

Birmingham. R. ANDERSON.

Testing Night Vision

SIR,—The disk-spotting test of N. Bishop Harman for night vision is a valuable contribution because it is simple and workable. I have seen all sorts of adaptometers, but it is evident that all simply estimate the visual threshold for white.

In the last war we had much trouble with night-blindness while in the desert. There were no ocular changes and it disappeared when we got to Palestine—probably a varied diet.

Bishop Harman's device, like all useful clinical methods, is simple and straightforward and is a relief to me after seeing all sorts of adaptometers which can only give the same result.—I am, etc.,

Melbourne. JAMES BARRETT.

Surgery for the Layman

SIR,—The review of Dr. M. Benmosché's *A Surgeon Explains* (February 7, p. 186) brings up the point: How much should the patient know of his disease and treatment? In the matter of *A Surgeon Explains*, I disagree with your reviewer. The book struck me as excellent and, though in some respects inadequate, a good education for the public. My copy was sent home. It was welcomed and critically read by "that curiously gullible and altogether illogical being—the patient," who wrote: "For the first time I have felt really kindly and understandingly disposed towards my gall-bladder."

The reviewer of the book upheld the wide tendency to hold things back from the public. How can the patient be anything but "curiously gullible and illogical" when his doctors consistently refuse to explain his body in health and illness? The poor fellow is only too eager to know and too willing to listen calmly and intelligently. But no, the medical man must still remain something of a witch-doctor-cum-black-magician; a being whose knowledge is on a plane far removed from the understanding of the layman. Your reviewer asks: "Are people really afraid of operations to-day because of any lack of knowledge of technicalities involved?" No one sensibly wants to teach them technicalities. The public is not even informed of the ordinary principles of surgery. This ignorance does, indeed, cause fear. Dr. Benmosché's book is an example of the type of propaganda we need to free our patient from the fear of the unknown, the dread of those moments when anaesthetist and surgeon are in control of his body.

Repeatedly I have found in hospital, in consulting room, and in sick bay that patients are happier and more confident when given a "lay translation" of diagnosis and prognosis. The doctor who shows his patients a picture of the acarus and its burrow, who makes a sketch to explain an injury and the importance of immobilization, who summarizes the reasons for the diet prescribed, or who explains in advance that "the operation will consist simply of . . ." is repaid by new interest and co-operation. He will mean more to his patients than if he only prescribed the necessary pills t.d.s., or (as I have often heard) merely said: "You need an operation: please be ready to enter hospital on Friday."

Except in certain obvious cases we should encourage the patient to appreciate what he has and how he will get better. Let him get a thrill (as he certainly should) from the knowledge that his 4-hourly tablets are filling his blood with microbe-fighting factors. Let him understand why the surgeon wants to push needles in his nose to wash out his sinuses. Let him glimpse the mixture of simplicity and complexity of the early appendicectomy. Let her know just what the surgeon intends when he suggests "removing that fibroid." Let us be ashamed whenever we allow a patient to leave the consultation with little more knowledge than that he has "a gastric stomach" or "a cardiac heart."

Let us get medical propaganda away from the inaccuracies of patent medicine advertisers and sensational Sunday papers. Let us above all appreciate that treatment is a fight involving two allies: the patient and his C.-in-C. the doctor. The better informed the patient the more willingly will he obey orders from his doctor's G.H.Q., and the less readily will he try out foolish side campaigns of his own.—I am, etc.,

A. S. PLAYFAIR.
Surgeon Lieutenant, R.N.V.R.

Economy of Medical Man-power

SIR,—I feel I should like to elbow my way into the controversy about the wastage of medical man-power in the Services. I deeply deplore the attitude of some of my colleagues, both in the Services and out, who go about complaining that Service M.O.s get no chance of treating decent cases. I feel strongly that general Service medicine is many years in advance of civil practice inasmuch as it has always been based on the idea of prevention. It is only now that the first puny birth spasms of preventive medicine are occurring in civil life, apart from the public health service, which forms a world of its own.

It is such an obvious truth that prevention is better than cure that it is largely overlooked in civil life—with the result that we are far prouder of curing one case than preventing a disease in ten others.

I am not proposing at all by the above remarks to condone the apparent superfluity of paper work in a medical officer's life. This may or may not be essential—I am not in a position to judge—but Service medicine definitely does appear to me to provide a basis on which future developments of a State service might well progress with advantage. At the moment our whole medical training is obsessed with the idea of diagnosis and treatment, and with this in mind one can understand the complaints of some Service M.O.s doing a job for which they have not been particularly trained. They wish for cases but do not stop to reflect that if they get them they are failing in their job.—I am, etc.,

J. GRAHAM TAYLOR,
Flying Officer, R.A.F.

Major Lloyd George, Parliamentary Secretary to the Minister of Food, has stated that 75% of the country's output of wheatmeal has been found by Ministry of Food tests to be up to the standards laid down by the Medical Research Council. There has been variation in wheatmeal bread owing to the different methods adopted by millers and bakers, but as the result of steps now being taken to help millers and bakers it is hoped that national wheatmeal will conform strictly to the required standards as to both vitamin B_1 and fibre.

Obituary

JOSEPH O'CARROLL, M.D., F.R.C.P.I.

His old students at home and over-seas will regret to learn of the death of Dr. Joseph O'Carroll, which took place at Dundrum, Co. Dublin, on February 18, in his 87th year. He was a member of the British Medical Association for many years and held office as vice-president of the Section of Medicine at the Annual Meeting of 1909 in Belfast.

Joseph Francis O'Carroll studied medicine in Dublin and graduated M.B., M.Ch. of the Royal University of Ireland in 1883; in 1889 he proceeded M.D., and in the following year was elected a Fellow of the Royal College of Physicians of Ireland, of which he was destined later to be President. In recognition of his work as professor of medicine and member of the Senate the National University of Ireland conferred on him its honorary LL.D. He had long been physician to the Richmond, Whitworth, and Hardwicke Hospitals, as well as consultant to other hospitals in Dublin.

Before taking up medicine Dr. O'Carroll had taken degrees in English and Classics, and held a lectureship in these subjects. He never lost sight of the value of this wider education and, knowing that such opportunities were not available to all students in the rush for qualification, tried unobtrusively to fit it in without departing from the main object of his clinical teaching. His lectures were enriched by his culture, and he had frequent letters from his old students all over the world telling him how he had widened their lives. Generations of students called him "Joc" (from his initials J. O'C.), and many were the stories told with affectionate caricature of Joc's slightly pedantic ways from which they had learnt so much. He was one of the first to point out the danger of unpasteurized milk in the spreading of tuberculosis, and made many other clinical observations before they were widely recognized. His publications included several papers on medical subjects, mainly on heart disease and diseases of the nervous system. His standard of medical ethics was an example to all who came in contact with him. He was widely travelled and, up till the last war, always took his holidays abroad in those parts of Europe where he could pursue his interest in architecture. He knew French and German fluently, and was acquainted with medical literature in three languages; the classics were his constant companions.

During the war of 1914-18 he was consultant physician to the Military Heart Hospital and to the Castle Hospital and, later, the only consultant physician to the Forces in Ireland, with the rank of colonel. He was awarded the C.B.E., but, unfortunately, it came during the time of the Black and Tan occupation of Ireland, and his principles forced him to relinquish the honour as a mark of his disapproval of the Government's policy. He was devoted to his hospital, of which he was senior physician for about forty years and a Governor for twenty. In memory of his son, who was killed at Gallipoli, he founded a children's ward in his beloved Whitworth Hospital. Having lost one son in the war, and another later as the result of gassing, he was pleased that one daughter carried on his profession.

Another of his many varied interests outside medicine was the Zoological Gardens at Dublin, on the council of which he sat for twenty years. He was proud that, at one time, it contained examples of the three anthropoid apes, and that lions born and bred there were sold to other zoological gardens of the Empire. As a mark of the affection in which he was held by his colleagues and the staff of the Gardens, three of the lionesses were named after his children.

Dr. O'Carroll had made up his mind early in life to retire at 70 and make room for the younger men. When the time came he kept his word, though it was with great difficulty that the hospital was ultimately persuaded to accept his resignation. His death occurred just as he would have liked it—as he might have said himself, "a running down of the engine" and a sinking in peace after less than a week's illness, with his mental faculties unimpaired to the end.

K. M. DUNCAN, M.B., F.R.C.S.

To the great regret of a wide circle, Kenneth McKenzie Duncan died at Preston on February 4, after a brief illness. He had been at work in the Preston Royal Infirmary on February 1, when he was apparently quite well.

K. M. Duncan was a Scot, born 65 years ago at Paisley. After taking the M.B., Ch.B. at the University of Glasgow in 1898, he fulfilled resident appointments at the Merryflats and Shieldhall Fever Hospitals, Glasgow, and later at the Woodilee Asylum, Lenzie. He went to London, studied at the London Hospital, and took his F.R.C.S.Eng. in 1907. Then he came to Preston and began in general practice. He was at that time completely unknown but rapidly made friends, who found confidence in him well justified. At first he did all his visiting on foot. He had a remarkable memory, never made out a visiting list, but completed his round of visits from memory. On the advent of the Insurance Acts he thought that being comparatively unknown he would have little to do, but he and his household were surprised at the constant ringing of the bell, with the ceaseless inflow of insurance cards, until he soon had a full panel list. In 1912 Duncan was appointed assistant surgeon to the Preston Royal Infirmary. During the last war he served in the R.A.M.C., mainly on hospital ships plying between Canada, South Africa, and in the Mediterranean. After the war, when he had given up general practice, he became a full surgeon on the Preston Infirmary staff. He quickly made a great reputation. He was not merely an operating surgeon, but had a wide knowledge of the whole medical field, being especially interested in pathology, gynaecology, and difficult midwifery. Much of his surgery lay in the two latter branches. His outlook upon and summing-up of a case was broad and wise and much valued. He had a singular disregard for fees or money. Frequently he sent no account to his patients in the private wards of the Preston Infirmary—as he was entitled to do—because he thought they looked as if they were unable to pay. A hard-luck story in the afternoon at his house would often result in the handing over of the fees left by the last one or two patients. One of his resident house-surgeons related that towards the end of his appointment, when thinking of taking a ship surgeoncy, Duncan said: "No; you mustn't do that, and you've been here long enough now; pack your bag and go to London. Take your Fellowship there, and here's something to help you to buy books"—slipping a £5 note into his hand as he spoke. That resident took his F.R.C.S., and has now made good by a tremendous experience in surgery.

Duncan was widely read and informed and had a broad philosophical outlook. On one occasion, when ill in bed, his doctor found him reading Juvenal; the Roman poet-satirist is not a common choice nowadays. He was extremely interested in humanity and in people. In his adopted town he had a wider circle of friends and acquaintances than men who had been born in the town and lived there all their lives, and gained their genuine affection. I think he never forgot any patient whom he had once had under his care, and though he made friends in all stations of life he had always a great sympathy with the poor. He will be much missed, for he had made a niche peculiarly his own. There can have been few better examples of the proverb, "A good name is rather to be chosen than great riches." He lives a widow and one son, who is within a few months of the final examination for his Cambridge M.B. and Conjoint diplomas,

A. E. R.

GEORGE BERTRAM DAVIS, F.R.C.S., Government Medical Officer, Southern Rhodesia, died on January 29 at the early age of 32. J. B. G. S. sends the following appreciation: He was educated at Bishops Stortford College, where he distinguished himself at work and at games. He was school cricket captain in his last year, and played a straight bat, as he did in his life generally; he was also a gifted actor and musician. His medical training was at King's College Hospital, and he qualified in 1934. With leanings towards the surgical side he took the F.R.C.S. after completing resident appointments at King's. He played for King's in various sports. Among his original work

was an ingenious device for retaining catheters in the urethra by the use of pipe-cleaners. His method is figured in most books devoted to general and to urogenital surgery in particular. He was appointed to the oversight of a large leper colony in Southern Rhodesia, but contracted malaria, necessitating splenectomy a year or so ago, and he had bouts of malaria afterwards. He was always a keen worker and one who, I felt, knowing him well, had a great career ahead of him. His untimely loss will be felt by very many both in and out of our profession.

We regret to announce the sudden death of Mr. VICTOR G. WALKER of Ipswich on February 11 at the early age of 44. Mr. Walker graduated M.B., B.Ch. at Dublin in 1919 and M.D. in 1921. After taking his diploma in ophthalmic medicine and surgery in 1923 and the F.R.C.S. of Edinburgh in 1926 he was appointed assistant ophthalmic surgeon to the East Suffolk and Ipswich Hospital in 1928. Two years later he became surgeon in charge of the eye department in succession to the late Dr. H. M. Gilmour, and fulfilled the duties of this office for a period all too brief. His sudden death came as an unexpected shock to his colleagues and friends.

Dr. MONTAGU CUTCLIFFE died suddenly at Torquay on February 11. He was born in London on March 14, 1869, and was educated at Blundell's School, Tiverton, and at St. Bartholomew's Hospital. After qualifying as M.R.C.S., L.R.C.P. in 1892 he served for a year as assistant house-surgeon at the Devon and Exeter Hospital, and then began practice at Dawlish, where he was medical officer to the Cottage Hospital and honorary medical officer to the Convalescent Home for Railwaymen. Dr. Cutcliffe was an old member of the Devon and Exeter Medico-Chirurgical Society, and having joined the British Medical Association in 1896 remained in membership after his retirement to Torquay. He was devoted to the West Country and to all field sports.

We regret to announce the death on February 15 of Dr. ARCHIBALD FRANCIS REIGNIER CONDER, who was in practice at Cheltenham. The son of Colonel C. R. Conder, R.E., after taking his M.D. at Edinburgh he went to practise at Cheltenham in partnership with the late Dr. John Bramwell in 1905. During the last war he was surgeon to the Suffolk Red Cross Hospital. Though subject to asthma all his life he succeeded in getting a commission in the R.A.M.C. in 1917, and was sent to France, where he won the *M.C.* He had been a member of the medical staff of the Cheltenham Ladies' College for thirty-six years, and a member of the B.M.A. from shortly after he was qualified. His decided opinions and a ready wit made him a welcome speaker at any discussions in the Gloucestershire Branch. Dr. Conder had a severe coronary thrombosis four years ago, but he was at full work again in six months' time, and was never daunted by physical pain. A second attack of the same nature ended his life. His courage and professional loyalty leave a memory that will long be cherished by a wide circle of friends and patients.

Dr. GEORGE WILLIAM KENDALL, a well-known ophthalmologist, died at his home at Stoke Newington on February 16. Dr. Kendall received his medical training in Dublin, where he qualified in 1893 and took his M.D. in 1895. In London he served for a time as chief clinical assistant at the Royal London Ophthalmic Hospital. He acquired a high reputation as a consulting ophthalmologist, practising in London and in Hertfordshire. He was senior consulting ophthalmic surgeon to the North Hertfordshire and South Bedfordshire Hospital at Hitchin, oculist to Hertfordshire County Council schools, and ophthalmic surgeon to the London Teachers' Association, the Cell Barnes Colony for the Feeble-minded, the Mildmay Memorial Hospital, and other institutions. In the last war he was an ophthalmic specialist with the rank of captain R.A.M.C., and he also served as deputy commissioner for medical services in the Hertfordshire area. Dr. Kendall was a diligent member of the Section of Ophthalmology of the Royal Society of Medicine and of the Oxford Ophthalmological Congress, and contributed to their discussions, especially on matters affecting the eyesight of children. He also interested himself in the organization of the profession, and particularly of his own branch. He became a member of the British Medical Association immediately on qualifying, and although he resigned at the time of the Insurance Act crisis, he rejoined in 1917, and afterwards did a great deal of local and central work on behalf of the Association. He was chairman of the City Division in 1928-9, and for some thirteen years he was a member of the Central Ophthalmic Committee, and helped in his quiet way to establish the National Eye Service.

We regret to announce that Dr. JOHN CHARLES ANDERSON of Rooley Lane, Bradford, died on February 15. He studied medicine at Newcastle-upon-Tyne and the London Hospital, graduated M.B. of the University of Durham in 1897, and proceeded to the M.D. two years later. After serving in the London area as an assistant medical officer under the Metropolitan Asylums Board, Dr. Anderson devoted himself to mental and nervous disorders, and during the last war, while holding a temporary commission as captain in the R.A.M.C., was neurological specialist in the Eastern Command and in the London District. He was next appointed senior medical officer at the Latchmere Neurological Hospital under the Ministry of Pensions. For the past fifteen years he had lived at Bradford, where he acted as visiting medical officer to the Odsal and the Daisy Hill Mental Hospitals. Dr. Anderson took a warm interest in the welfare of ex-Service men, and was for some time president of the Brierley Division of the British Legion. He first joined the British Medical Association in 1901. His wife and daughter survive him.

We have to announce with regret the death on February 21 of a veteran member of the British Medical Association, JOHN SOMERVILLE, F.R.C.S.Ed., consulting surgeon to the Macclesfield Infirmary. Dr. Somerville studied medicine at Edinburgh University and the School of the Royal College of Surgeons of Edinburgh. He took the L.R.C.P. and L.R.C.S. diplomas in 1870, and served as house-surgeon at the Edinburgh Royal Infirmary before setting up in practice at Macclesfield. He joined the British Medical Association as long ago as 1877 and was elected a Fellow of the Royal College of Surgeons of Edinburgh in 1884.

We regret to announce that Dr. HERBERT MALINS of Warwick died on February 24. He was the second son of the late Sir Edward Malins, M.D., F.R.C.P., professor of midwifery in the University of Birmingham, and was born at Cradley, Staffs, on September 17, 1869. He was educated at Malvern College, at Oxford University, where he took his B.A. in 1892, and at Edinburgh, where he graduated M.B., C.M. in 1898, becoming F.R.C.S.Ed. in 1903. His first post after qualifying was that of house-surgeon to Sir Thomas Chavasse at the Birmingham General Hospital; he then held house appointments at the Marylebone Infirmary in London and at the Simpson Memorial Maternity Hospital in Edinburgh. He was medical officer to the Warwick Hospital from 1908 to 1935. He served in two wars: as civil surgeon to the troops in South Africa, and with a temporary commission in the R.A.M.C. in 1916. Dr. Malins took a prominent part in local public life, was a J.P. for the borough of Warwick, and served twice as mayor—in 1920 and 1927. He had been a member of the British Medical Association for forty-five years and was at one time chairman of the Warwickshire Local Medical and Panel Committee.

Dr. SIMON ISAAC, formerly assistant professor in the University of Frankfort-on-Main, and director of the Jewish Hospital in that city from 1925 to 1939, has died in exile in London at the age of 60. A graduate of Strasbourg, he began his career under the guidance of Friedrich Kraus in Berlin. Most of his work was devoted to theoretical and practical aspects of diabetes mellitus and other diseases of metabolism. In the voluminous monograph written with von Noorden he put down his great experience of this subject. Shortly before he died he was asked by an English publisher to translate the book and adjust it to the present state of knowledge.

The following well-known medical men have died abroad: Dr. WALTER LINDSAY NILES, formerly professor and dean of Cornell University Medical College, aged 63; Dr. BENIGNO T. ESCOBAR, professor of clinical surgery at the medical faculty of the University of Asunción, Paraguay; Prof. ALEJANDRO CENTENO of the University of Córdoba, Argentina; Dr. HERMANN MATTI, professor of surgery at Berne University, aged 62; and Dr. ADOLPHO LUTZ, expert in tropical medicine and medical zoology, in whose honour the Brazilian State of Sao Paulo recently founded an institute, and Rio de Janeiro founded a museum of natural history which will bear his name.

Medical Notes in Parliament

The Nation's Food

During a debate on the vote for the Ministry of Food in the House of Commons on March 3, Major LLOYD GEORGE said that we were facing a difficult period and our food imports this year would be reduced. It might even be necessary to reduce to some extent existing rations. Whatever restrictions we might have to suffer, thanks to our policy of building up our reserves over the last twelve months the nation would be adequately fed. Special efforts were being made to prevent children suffering from restrictions of food supplies which were inevitable during war, and the evidence available encouraged the Ministry of Food to hope that their efforts were going to be successful. About 650,000 children were obtaining meals at school in Great Britain, about 3,500,000 were receiving milk in school in addition to priority supplies of fresh milk at home. Further free supplies of certain preparations—blackcurrant juice, orange juice, and cod-liver oil—were made available for them, and they enjoyed priority for supplies of eggs and oranges. Speaking of the increase in canteens and British Restaurants, he said that a great deal had been done to provide meals for the workers, but he was not yet satisfied. Young people not fully grown were now working, and they must be properly fed. Many women also were in factories for the first time, and some of them were not accustomed to feeding themselves for the work they were now doing. It was the duty of the Ministry to see that these people did not suffer.

Despite all difficulties in regard to milk supply, taking liquid milk, condensed and powdered milk the nation had not had less than last year. Whereas last winter—from October to February—434,000,000 gallons of liquid and condensed milk were consumed, in the corresponding period of this winter the amount made available was 505,000,000 gallons. There were two sides to the question of the national wholemeal loaf. If we increased the extraction rate of flour to 85% we should save shipping space and supply a bread which had certain nutritive advantages; but because of the consequent reduction in the supply of animal feeding stuffs we should lose some milk, meat, or eggs, and would have a bread which was not what the people preferred. The weight which ought to be given to these conflicting arguments must be influenced, above all, by shifting prospects. Only the Government was in a position to know at what moment the balance tipped down on the side of 85% extraction. When and if that decision was taken, the change could be effected without delay. In conclusion, he said that it was encouraging after 2½ years of war that the national diet was good both in quantity and quality, and there were no indications that it had in any way impaired the health of the nation.

OUR DAILY BREAD

Sir E. GRAHAM-LITTLE said he did not think the public would resent compulsion to eat wholemeal bread if they were told that the nutrition value was higher and that it would save considerable shipping space. There was considerable anxiety in the medical profession in regard to certain recent developments. First, there was the rise in the mortality from and incidence of tuberculosis, a disease universally accepted by medical statisticians as an index of malnutrition. Secondly, there had been a very extensive epidemic of gingivitis, which disease was an early stage of scurvy. Scurvy was a deficiency disease. In the debate last week it was made clear that the record of health in the Army had been on the whole satisfactory, with the exception of dental disease. He thought it was stated that 80% of the men in the Army were found to have dental caries, and this was also regarded as a deficiency disease. The use of white flour had already been forbidden in South Africa and Southern Ireland. He believed that the whole of the position in this country had been brought about by a certain influence. Undoubtedly there was a strong control on the production of bread, and even, he thought, on the Ministry of Food, by a combine of millers practically consisting of three firms, which between them controlled 80 to 90% of the milling. An impartial inquiry would have to be made into why they obstructed what every expert who had approached the matter advised—namely, the prohibition of the white loaf and the provision of a proper wholemeal loaf.

Dr. HADEN GUEST said that while the scientific side of rationing was admirable, it was a question whether the policy side of rationing was quite as realistic. It would be better to look at the rationing position from the point of view of the physical survival of the nation rather than from the scientific standpoint of optimum nutrition. At present we had almost optimum nutrition. Ought not there to be arranged priorities in rationing? Milk was necessary for young people, and a certain amount was necessary for adolescents between 14 and 18, especially now that they were being called on for additional duties. He hoped they were not forgotten. The best way of dealing with milk would be to cheapen the cost. That could be done either by cutting down the large amount paid for distribution or by delivering the milk to depots and letting people collect it themselves at a very much lower price than when it was delivered at the door. It was certain that a considerable number of children were not getting as much milk as they ought to get.

Home Guard Medical Organization

Mr. SANDYS stated on March 3 that general instructions on the principles of the medical organization and the duties of Home Guard medical officers had been issued from time to time to all Home Guard officers. The detailed organization and duties must, however, be left to be decided by Home Guard battalion medical officers in accordance with local conditions. Medical advisers had been appointed in more than half the zones. Mr. Sandys also stated that the supply of morphine for Home Guard casualties in the event of invasion was considered adequate in view of the local defence role of Home Guard units. In the case of battalions covering a large country district, Home Guard regimental aid posts were being established, and these would contain sufficient morphine for the treatment of casualties. Arrangements had also been made where necessary for a battle reserve of morphine to be kept ready for issue to isolated posts when invasion was imminent.

Woman-power

Opening a debate about woman-power on March 5, and speaking for the Ministry of Labour, Mr. MCCORQUODALE said that medical boards for women had women members. If a girl wished to be examined by women only, boards consisting wholly of women had been set up, although few demands for this had been made. Girls in the 20-21 group who chose industry would normally go to a Royal Ordnance factory, but specially suitable girls might go into hospital work. Nursing was in a special category. Large numbers were required, and, as nursing was essentially a voluntary profession, girls could volunteer for it at any time up to the issue of their calling-up notices.

Dr. EDITH SUMMERSKILL and other speakers discussed the provision of day nurseries for the young children of women on war work. Miss HORSBRUGH said 1,064 nurseries had been approved. She remarked that women could do valuable part-time work in domestic duties in hospitals and nurseries. Unless this aid could be secured the hospitals and nurseries would be unable to continue. She had found that some mothers who desired their children to be cared for did not desire them to be placed with numbers of other small children during the season when whooping-cough, colds, and possibly measles were prevalent. Medical men were anxious about having large numbers of small children brought together, particularly at this time of year. They knew of cases where disease had spread, though she would not say in an alarming way. In some districts the nurseries were not being filled at present. Mr. ERNEST BEVIN said women must be induced to look on the nurseries as national nurseries, introduced to further the war effort.

Medical Supplies

Replying for the Ministry of Supply on March 5, Mr. CHARLES PEAT said the total quantity of essential medical supplies was sufficient to meet national requirements. There was no evidence, so far as he knew, of shortage of supplies to retail chemists. In this matter the Ministry of Supply had been advised by the Ministry of Health and by a spokesman appointed by the Medical Research Council.

N.H.I.: Simplified Administration

Miss HORSBRUGH informed Mr. Logan on February 25 that Mr. Johnston and Mr. Brown recently reviewed the administration of national health insurance to effect the maximum economy in man-power. Throughout this review they had been in close touch with their respective Consultative Councils, to whose advice and assistance they were greatly indebted. Some of the more important economies decided upon would be embodied in a circular to be issued to approved societies shortly. Others would be announced as soon as the necessary Regulations had been made under the wartime powers conferred by Section 8 of the National Health Insurance Act, 1941. These emergency measures would be brought into operation from the earliest practicable dates.

Committee on Women's Services

Mr. ATTLEE, in reply to a question by Miss Rathbone on February 24, said that the Government had decided to set up a committee with the following terms of reference: "To inquire into and report on amenities and welfare conditions in the three women's Services, and to make recommendations." The chairman of the committee is Miss Violet Markham, and the two medical members are Air Vice-Marshal Sir David Munro, secretary of the Industrial Health Board of the Medical Research Council, and Dr. Edith Summerskill, M.P.

Maternal Mortality in Scotland

Mr. JOHNSTON stated on February 25 that in Scotland the maternal mortality rates per 1,000 live births for the years 1939, 1940, and 1941 were 4.5, 4.4, and 4.9 respectively. Schemes under the Maternity Services (Scotland) Act, 1937, were in operation in 40 out of the 55 local authority areas.

He circulated a table to show: (1) the dates on which these 40 schemes came into operation; (2) the number of maternal deaths in each local authority area; and (3) the maternal mortality rates per 1,000 live births.

Employment of Married Nurses.—On February 18 Mr. D. ADAMS asked the Minister of Labour if, in view of the urgent need of nurses in many hospitals in the country, it was intended to direct fully qualified married nurses without children to take up this form of employment. Mr. TOMLINSON replied that in the case of married nurses, as of other married women, proper account must be taken of their domestic responsibilities. Subject to such responsibilities, he felt sure that married nurses in general were prepared to make their services available, but if necessary the Minister would be prepared in appropriate cases to issue directions. Mr. ADAMS asked if Mr. Tomlinson was aware that a very serious situation now prevailed in regard to the shortage of nurses. While it was true that some in the category he had mentioned had volunteered, was the Minister aware that large numbers were declining to volunteer, and if, in view of the urgency, the directions could not be given as suggested. Mr. TOMLINSON said that that was not the responsibility of his Department. Mr. BUCHANAN asked if it would not be much better to see that the conditions of employment were first made more attractive.

Food Shortage in Occupied Countries.—Mr. DALTON, on February 17, said that the worst conditions in German-controlled Europe prevailed in Greece, in some parts of Poland, and in occupied Russia. While he would not be prepared to say what proportion of the death rate was due to lack of food, there could be no doubt that deaths from starvation were occurring in these territories. In other occupied countries reports did not indicate any deaths directly attributable to food shortage, though in Belgium and occupied France some part of the increase in the mortality from certain diseases, notably pneumonia, was probably due to insufficient nutrition. In Norway, the Netherlands, and Czechoslovakia the diet, though well below pre-war standards, had not been so inadequate as to cause any marked increase in the death rate.

Antitetanus Injections.—In reply to a question whether wounded soldiers in hospital or at first-aid posts were asked for consent before antitetanus or other injections were administered, Mr. SANDYS said that a wounded soldier was always free to refuse an injection. If, however, the patient's condition was such that the surgeon considered him incapable of rational judgment he might use his own discretion.

Notes in Brief

On March 4 Mr. E. A. Nicoll, F.R.C.S., of Mansfield addressed a meeting of trade unionist M.P.s on the scheme adopted at Derbyshire collieries for the rehabilitation of injured miners. The meeting, which included most of the miner M.P.s, agreed that this scheme was admirable and could be followed elsewhere. [See Mr. Nicoll's article, *British Medical Journal*, April 5, 1941.]

The Services

AWARDS AND MENTIONS IN DISPATCHES

The King has awarded the M.C. to Captain Elliot David Forster, R.A.M.C., in recognition of gallant and distinguished services in the Middle East.

The King has awarded the M.C. to Captain B. F. B. Gulliver, R.A.M.C., and Captain (Temporary Major) G. T. M. Hayes, I.M.S., in recognition of gallant and distinguished services in the South-West Pacific.

Surgeon Lieut.-Commander L. G. Yendoll, R.N., and Temporary Surgeon Lieut. J. C. de R. Sugars, R.N.V.R., have been mentioned in dispatches in recognition of distinguished services in the Middle East.

CASUALTIES IN THE MEDICAL SERVICES

ROYAL NAVY

Wounded.—Surg. Lieut. W. M. Brown, R.N.V.R.

ROYAL ARMY MEDICAL CORPS

Prisoners of War.—War Subs. Capt. J. H. D. Millar, Lieut. A. G. Hooker.

INDIAN MEDICAL SERVICE

Missing.—Maj. J. O'Neill, Capt. P. Dass, Capt. A. M. McGavin, Lieut. N. G. Ajgaonkar, Lieut. B. C. Karmaker, Lieut. V. V. Narayanamurti, Lieut. M. Sarwar.

The Colonial Office published on March 6 a list of casualties among the European civilian population and the local volunteer force of Malaya which were reported by the Governor before the Japanese occupation. Dr. C. P. Allen, Dr. L. J. Clapham, and Dr. M. P. O'Connor and Mrs. O'Connor (Sarawak), Dr. L. W. Evans (Penang), and Dr. G. MacB. Graham (Brunei) are included as "prisoners" and Dr. G. A. Ryrie as "captured."

Universities and Colleges

UNIVERSITY OF OXFORD

In Congregation on February 28 the honorary degree of M.A. was conferred on Clare Aveling Wiggins, C.M.G., M.R.C.S., L.R.C.P., formerly Principal Medical Officer in Uganda, who presented to the Hope Collection his collections of African lepidoptera.

UNIVERSITY OF CAMBRIDGE

At a Congregation held on February 28 the following medical degrees were conferred by proxy:

M.B., B.CHIR.—P. Sainsbury, R. J. R. Cureton, H. L. Ellis, A. G. Leishman, D. G. Wraith, J. W. A. Crabtree.

The following candidates have been approved at the examination indicated:

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.—*Part I:* G. K. F. Cohen, R. McK. Crichton, T. Culloty, A. B. Donald, Maria E. Grossman, H. T. Halper, H. R. C. Hay, C. J. C. G. Hodson, H. R. Holmes, D. A. Jennings, M. B. Leitch (with distinction), J. McM. Mennell, D. J. Mitchell, R. G. Moffat, J. Y. Rabinowitch, Katharina Rosenkranz, A. W. Simmins, J. H. Smitham, Lilian H. Walter, R. A. Williams, H. Wormald.

UNIVERSITY OF BIRMINGHAM

A week-end course in industrial medicine for works medical officers and other members of the medical profession will be held at the Medical School, Hospitals Centre, Birmingham, on Saturday and Sunday, March 21 and 22. On March 21, at 2 p.m., Prof. Seymour Barling will discuss "The Injured Workman," and at 3.15 p.m. Dr. J. M. Davidson will speak on "Some Common Toxic Hazards in Industry." The programme for March 22 is as follows: 10.30 a.m., Dr. E. H. Capel, "Health Factors in Industrial Absenteeism"; 11.45 a.m., Dr. T. L. Hardy, "The Treatment of Medical Emergencies in Factories"; 2.15 p.m., Mr. William Gissane, "A Scheme for the Treatment of the Injured Workman"; 3.30 p.m., Dr. Sargant Florence, "Industrial Fatigue." Forms of application for the course, the fee for which is £1 1s., may be obtained from the secretary, University of Birmingham, Edmund Street, Birmingham, 3.

UNIVERSITY OF DUBLIN

SCHOOL OF PHYSIC, TRINITY COLLEGE

Prof. J. F. Donegan, M.D. (University College, Galway), has been appointed to deliver the John Mallet Purser Lecture in 1942.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Prof. A. J. E. Cave will give a series of museum lecture-demonstrations, open to advanced students and medical practitioners, on topographical anatomy at the College (Lincoln's Inn Fields, W.C.) on Mondays, Wednesdays, and Fridays, March 16, 18, 20, 23, 25, and 27, at 2.30 p.m.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—M. Fishman, H. Kessel, N. F. Murphy, B. A. F. Stephens, C. J. O. Taylor.

MIDWIFERY.—K. M. Donahue, C. H. Kitchen, J. S. Pegum, P. A. Watson.

The diploma of the Society has been granted to C. H. Kitchen.

EPIDEMIOLOGICAL NOTES

Discussion of Table

For the fifth consecutive week the incidence of measles in England and Wales has risen, and the notifications are 203 in excess of the total for the preceding week. Lancashire, where the cases increased from 226 to 341, was mainly responsible for this, the largest centres of infection in this county being Oldham C.B. 102, Manchester C.B. 36, Prestwich M.B. 48, Royton U.D. 22.

The returns of the individual counties for the other common infectious diseases of childhood did not show any notable difference, although there was a tendency for scarlet fever to decrease in incidence in the southern part of the country and to increase in the northern.

The combined incidence of typhoid and paratyphoid has fallen to only 9 cases, which is below the usual pre-war level and is in striking contrast to the large number of cases recorded last July and August (the largest weekly total was 373).

No big changes occurred in the distribution of dysentery. It reappeared in Cumberland, Border R.D., where 8 cases were reported. Surrey returned the largest county total, 27 cases, an increase of 20 compared with the preceding week.

Owing to the better record of Glasgow the number of cases of acute primary pneumonia notified in Scotland decreased during the week by 61. There was a relatively large rise in the incidence of dysentery, with outbreaks in the counties of Stirling and Dumbarton. With the exception of scarlet fever, the common infectious diseases of childhood were more prevalent than in the preceding week.

An increase in the number of cases of diphtheria and a decrease in the incidence of measles occurred in Eire. Approximately two-fifths of the cases of both these diseases were notified in Dublin.

Cerebrospinal Fever

An increase of 22 cases of cerebrospinal fever in England and Wales during the week resulted in the largest total since last summer. The trend of this disease has fluctuated considerably during the first weeks of this year, and a rise in the number of cases reported has alternated with a fall. As a result, although the trend has been towards greater prevalence, the total for the week reviewed was only 10 more than that recorded five weeks earlier. This oscillating trend is in contrast to that of 1940 and 1941, when the weekly cases showed an unbroken increase during the first weeks of the year. In the week reviewed one-quarter of the total cases occurred in Lancashire, where the incidence has been increasing lately. The totals for the past five weeks were 21, 26, 27, 33, and 45. The chief centres of infection were the county boroughs of Blackpool, Liverpool, and Manchester, where 10, 11, and 13 cases respectively were reported during the week.

Returns for the Week Ending February 28

The returns for the infectious diseases included the following number of notifications: scarlet fever 1,124, whooping-cough 1,315, diphtheria 859, measles 2,335, pneumonia 1,148, cerebrospinal fever 164, dysentery 131. Influenza was responsible for 74 deaths in the great towns.

No. 7

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended February 21.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942 (a)	(b)	(c)	(d)	(e)	1941 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	187	11	34	—	9	434	21	70	1	12
Deaths		—	1				4	7		
Diphtheria	855	35	230	51	30	1,042	54	352	26	26
Deaths	32	3	8	3	1	31	1	6	2	1
Dysentery	137	12	49		—	202	36	31		—
Deaths		1	—	—	—		—	—	—	—
Encephalitis lethargica, acute	5	—	1	—	—	5	—	2	—	—
Deaths		—	—				—	—		
Enteric (typhoid and paratyphoid) fever						25	4	5	—	1
Deaths						—	—	—	—	—
Erysipelas			51	11	2			57	7	1
Deaths		1	—				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	30	4	6	9	2	31	4	8	9	2
Measles	1,996	151	148	95	12	14,976	269	176	—	19
Deaths	1	—	3	1	—	14	1	2	—	—
Ophthalmia neonatorum	85	7	18	4	—	76	2	16	1	—
Deaths										
Paratyphoid fever	6	1	3	—						
Deaths	1	—		—						
Pneumonia, influenzal*	996	41	17	3	3	1,874	89	53	11	12
Deaths (from influenza)	62	1	5	1	1	314	26	13	3	8
Pneumonia, primary			278	21				446	10	
Deaths		57		14	9		107		18	20
Polio-encephalitis, acute	1	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	6	1	1	3	—	29	—	1	—	—
Deaths		—	—				—	—		
Puerperal fever	1	1	19	1	—	1	1	19	—	—
Deaths		—					—			
Puerperal pyrexia	181	8	22		2	150	7	32		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,159	46	193	40	19	1,238	53	172	28	30
Deaths	1	—	—	—	—	1	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	3	—	7	8	1					
Deaths	2	—								
Typhus fever	—	—	—	—	—	—	—	—	2	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,211	133	67	16	23	3,258	59	597	—	19
Deaths	8	2	—	—	—	34	—	13	1	1
Deaths (0–1 year)	390	44	80	43	19	411	30	57	54	25
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	5,522	773	804	235	129	6,891	1019	837	250	196
Annual death rate (per 1,000 persons living)			18·1	15·7	‡			18·2	16·6	17·2
Live births	5,643	600	798	311	223	4,818	345	839	309	222
Annual rate per 1,000 persons living			16·5	20·8	‡			17·0	20·5	19·4
Stillbirths	239	32	46			210	15	37		
Rate per 1,000 total births (including still-born)			55					42		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

Colonel G. Riddoch will deliver a lecture on "Nerve Injuries" at the Weston Hotel, Bath, on Thursday, March 19, at 5.30 p.m. All Service medical officers and civilian practitioners will be welcome.

The Faculty of Radiologists announces that Prof. Henry Cohen will give the Skinner Lecture on "The Nature, Methods, and Purpose of Diagnosis" at the Royal Society of Medicine, 1, Wimpole Street, W., at 2 p.m. on Friday, March 20. The lecture is open to all members of the medical profession. On March 21 at 10.30 a.m., at 32, Welbeck Street, W., the Therapy Section will discuss the control and treatment of radiation reactions.

The annual meeting of the London and Counties Branch of the Medical Superintendents Society will be held to-day (Saturday, March 14) at 2.30 p.m., at B.M.A. House, Tavistock Square, London, W.C.

The Lady Tata Memorial Trust is prepared to consider applications from workers in Great Britain for grants or scholarships for research on blood diseases, with special reference to leukaemia. Under present conditions it is not possible to deal with new applications from workers over-seas. Circumstances permitting, the awards now advertised would be made in respect of the academic year beginning on October 1, 1942. Inquiries or applications should be addressed to the Secretary, Scientific Advisory Committee, Lady Tata Memorial Trust, c/o London School of Hygiene, Keppel Street, London, W.C.1, not later than March 31, 1942.

The Ministry of Labour and National Service, in its announcement of an extension of the National Service Acts to men who have reached the age of 46, states that the new Proclamation will be followed by an extension to doctors and dentists between 41 and 46 of the arrangements that already exist for their recruitment below the age of 41. These arrangements provide for the review of each individual case by the Central Medical War Committee, the Dental War Committee, and their local committees, which take into account the needs both of the Forces and of the civilian population. The practitioners concerned will in due course be required to complete the usual form of particulars for the use of these committees.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

Authors desiring REPRINTS should communicate with the Secretary of the Journal Board, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager (hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be sent to the Secretary.

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QUERIES AND ANSWERS

Treatment of Chilblains

A. S.-L. writes in reply to C. C. B.'s inquiry: Some years ago I was afflicted with a chilblain during my first winter in Hampshire after foreign service. I was recommended the local application of a raw onion to the chilblain. Of course I scorned the suggestion, but, as the chilblain continued to irritate, just for experiment I tried this treatment, savouring of folk-medicine. I took part of the inside of an onion, which, owing to its shape, can be easily applied to the side of the toe, as it fits on like a cap. I applied the raw onion over the affected area, then a small bandage, put on a sock, and went to bed. There was a certain amount of discomfort and heat. I removed the onion in the morning. I tried this homely treatment for two nights, and also when I was again threatened with a chilblain. I offer no explanation, but the chilblain, which was beginning to cause annoyance, disappeared. Another treatment is to paint the chilblain, if unbroken, with turpentine. This I used when a small boy with benefit.

Income Tax

Naval Officer's Gratuity

"R.N." completed five years' service in August, 1939, received his gratuity of £1,000, and paid tax on it in 1940-1 (at the 8s. 6d. rate applicable to that year) because he was then placed on the permanent list of R.N. medical officers. He learns that payments of gratuity made after April 1, 1940, are now spread over the five years during which they were earned. If that had been done in his case the amount of tax borne by him would have been less by, say, £125. What further action can he take?

*** We are without special knowledge as to the authority for the change in the basis of taxing these gratuity payments, but it seems probable that the strict legal basis has been set aside by a concession of the Treasury. If that is so it is very unlikely that the Treasury will consent to reopen cases which arose before the date as from which the new practice has been authorized.

Absent Partner: Expenses

"M.S." has hitherto been allowed to deduct three-eighths of his rent, rates, heating, and lighting expenses as representing the amount applicable to the professional part of his house. He is now acting as whole-time superintendent of a hospital, and another partner has had to be taken into the practice. How does this affect the amount allowable for rent, rates, etc.?

*** So far as we are aware no general rule has been laid down on this point, and there may be some diversity of practice. To the extent to which the rooms formerly set aside for professional purposes are now used privately it is clear that "M.S." cannot sustain an objection to an alteration in the ratio applied for income-tax purposes. If, however, such rooms are still left outside the private use of "M.S." and his family we consider that he can reasonably claim that the cost of maintaining them can be charged against the receipts of the practice. We assume that the firm's plate still appears outside the premises, and that some of the rooms are available and ready for use by one of the other partners if the occasion arises.

LETTERS, NOTES, ETC.

Vocal Resonance and Fremitus

Dr. ERNEST MOORHEAD (Winnipeg) writes: Dr. Mary Sheridan's query (November 8, 1941, p. 680) interested me. Teaching students for many years and getting no assistance from textbooks, I had to find an explanation of increased and diminished fremitus and its significance. I think we may accept fremitus and resonance as being produced by vibrations conveyed from the vocal cords. I used the following simile. If a shotgun be fired at a target forty to fifty yards away most of the pellets will be in a relatively small area, because the direction of the energy is controlled by the length of the barrel. Remove two feet of gun barrel and few pellets will reach the target owing to lateral diffusion. Diffusion of the laryngeal vibrations is prevented by the relatively thick walls of the trachea and larger bronchi, but takes place into the alveoli from bronchioles. In a lobar pneumonia the alveoli are solid, preventing diffusion, so that vibrations are conveyed unchanged to the periphery of the lung, so long as the bronchioles are not compressed. The portion of solid lung between the hand and the nearest patent bronchiole is a better conveyer of vibrations than the sponge-like normal lung. Interpose a layer of fluid as in effusion and the vibrations are stopped; though in some cases of effusion I have occasionally found fremitus increased, due, I think, to compression of the alveoli at the periphery. Physicists may not accept this explanation, but it enabled the student to reach a logical conclusion as to the condition present in a case of marked dullness on percussion when the temperature range did not help.

First Aid in Shock

Dr. J. L. BARFORD (Redhill) writes: In the treatment, preventive or actual, of shock, warning is given in your columns (February 21, p. 267) against overheating. It is universally agreed, however, that warmth in suitable moderation is of the very greatest importance. Towards this end warm drinks are rightly advocated. But is there not a tendency to suppose that a comparatively minor casualty temporarily waiting in the open or in an unheated room will come to no harm if adequately blanketed, etc.? It is forgotten, perhaps, that against the pint or so of warm fluid that may be put into his stomach he is inhaling some twenty times a minute 1/2 to 3/4 pint of possibly ice-cold air, unwarmed by his collapsed nasal mucosa, etc. May I suggest the advisability of covering the nose and mouth of such an exposed casualty very lightly with the edge of a blanket, a muffler, or suchlike. This will become very rapidly warmed (and moistened) by the expired air, and at least the chill will undoubtedly be taken off the inspired air.